SEQUENCE LISTING

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<120> CLASP-5 Transmembrane Protein

<130> 020054-000511US

<140> US 09/736,960
<141> 2000-12-13

<150> US 60/160,860
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<150> US 60/240,508
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<170> PatentIn Ver. 2.1

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His Leu Asn Ser Leu Asp Val Gln Leu Ala Gln Glu Leu Gly Asp Phe
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act gat gac gac ttg gac gtg gtg ttc acg cca aag gaa tgt agg act 213
Thr Asp Asp Asp Leu Asp Val Val Phe Thr Pro Lys Glu Cys Arg Thr
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ttg cag ccc tct ttg ccg gag gaa ggg gtt gaa ctg gac cct cat gtc 261
Leu Gln Pro Ser Leu Pro Glu Glu Gly Val Glu Leu Asp Pro His Val
 35   40   45   50

agg gac tgt gtt cag acc tac atc cgt gag tgg cta atc gtg aac cgg 309
Arg Asp Cys Val Gln Thr Tyr Ile Arg Glu Trp Leu Ile Val Asn Arg
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aaa aac caa gga agt cca gaa atc tgt ggc ttt aaa aag act gga tct 357
Lys Asn Gln Gly Ser Pro Glu Ile Cys Gly Phe Lys Lys Thr Gly Ser
                70   75   80

cga aaa gat ttt cac aag acg ctt ccg aaa cag acg ttt gag tcg gaa 405
Arg Lys Asp Phe His Lys Thr Leu Pro Lys Gln Thr Phe Glu Ser Glu
            85   90   95

acc ttg gag tgc agt gaa ccc gct gct cag gca ggc ccc cgc cac tta 453
Thr Leu Glu Cys Ser Glu Pro Ala Ala Gln Ala Gly Pro Arg His Leu
        100   105   110

aac gtg ctg tgc gac gtg tct ggg aaa ggc ccc gtc act gcc tgt gac 501
Asn Val Leu Cys Asp Val Ser Gly Lys Gly Pro Val Thr Ala Cys Asp
115   120   125   130

cag cag gtg tcg gca ctg gac ttt gaa tac cac aac cac gag gca aga
Gln Gln Val Ser Ala Glu Asp Phe Glu Tyr His Asn His Glu Ala Arg
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Arg Thr Asn Arg Gln Ala Glu Leu Phe Ala Leu Tyr Pro Ser Val Asp
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gag gag gat gct gtg gaa ata cgt cca gta cca gaa tgt ccc aag gaa     693
Glu Glu Asp Ala Val Glu Ile Arg Pro Val Pro Glu Cys Pro Lys Glu
        180                 185                 190

cac ctg ggc aac aga ata ttg gtc aag ttg ctg acc ttg aag ttc gag     741
His Leu Gly Asn Arg Ile Leu Val Lys Leu Leu Thr Leu Lys Phe Glu
195                 200                 205                 210

att gaa att gag ccc ctg ttt gcc agc att gcc ctc tac gat gtt aaa     789
Ile Glu Ile Glu Pro Leu Phe Ala Ser Ile Ala Leu Tyr Asp Val Lys
                215                 220                 225

gaa agg aaa aag atc tca gaa aat ttt cac tgt gac ctg aac tct gac     837
Glu Arg Lys Lys Ile Ser Glu Asn Phe His Cys Asp Leu Asn Ser Asp
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cag ttc aaa gga ttt ctg cga gct cac acg cct tca gtg gcc gca tca     885
Gln Phe Lys Gly Phe Leu Arg Ala His Thr Pro Ser Val Ala Ala Ser
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agt cag gcg aga tct gca gtc ttc tca gtc acc tac ccg tcc tca gac     933
Ser Gln Ala Arg Ser Ala Val Phe Ser Val Thr Tyr Pro Ser Ser Asp
        260                 265                 270

atc tac ctg gta gtc aag att gaa aaa gtc ctg cag cag gga gat att     981
Ile Tyr Leu Val Val Lys Ile Glu Lys Val Leu Gln Gln Gly Asp Ile
275                 280                 285                 290

gga gac tgt gca gag ccc tac acg gtt atc aaa gaa agt gat ggt gga    1029
Gly Asp Cys Ala Glu Pro Tyr Thr Val Ile Lys Glu Ser Asp Gly Gly
                295                 300                 305

aag agt aaa gaa aag att gaa aaa cta aaa ctc caa gct gaa tcc ttc    1077
Lys Ser Lys Glu Lys Ile Glu Lys Leu Lys Leu Gln Ala Glu Ser Phe
            310                 315                 320

tgc cag cgt ttg ggg aaa tac cgg atg ccc ttt gcc tgg gca ccc ata    1125
Cys Gln Arg Leu Gly Lys Tyr Arg Met Pro Phe Ala Trp Ala Pro Ile
            325                 330                 335

agc tta tca agc ttc ttc aat gtc tcc acc ctt gag agg gag gta act    1173
Ser Leu Ser Ser Phe Phe Asn Val Ser Thr Leu Glu Arg Glu Val Thr
        340                 345                 350

gat gtg gac tct gtg gtt ggg aga agc cca gtg ggt gaa cgg agg aca    1221
Asp Val Asp Ser Val Val Gly Arg Ser Pro Val Gly Glu Arg Arg Thr
355                 360                 365                 370

ttg gcc caa tct aga agg ctt tct gaa aga gcc ctc tcc ttg gag gaa    1269
Leu Ala Gln Ser Arg Arg Leu Ser Glu Arg Ala Leu Ser Leu Glu Glu
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ttt ttc aag cag gaa gga gat cgc ctt agc gat gaa gac tta ttc aag    1365
Phe Phe Lys Gln Glu Gly Asp Arg Leu Ser Asp Glu Asp Leu Phe Lys
        405                 410                 415

ttt tta gct gac tac aaa aga tca tca tcc tta cag aga cga gtc aag    1413
Phe Leu Ala Asp Tyr Lys Arg Ser Ser Ser Leu Gln Arg Arg Val Lys
        420                 425                 430

tca att cca ggc ttg cta aga ctg gag att tct aca gct cca gag atc    1461
Ser Ile Pro Gly Leu Leu Arg Leu Glu Ile Ser Thr Ala Pro Glu Ile
435                 440                 445                 450

atc aat tgc tgt ctg act cct gaa atg ctg ccc gtg aaa ccc ttt cct    1509
Ile Asn Cys Cys Leu Thr Pro Glu Met Leu Pro Val Lys Pro Phe Pro
                455                 460                 465

gaa aac cgg aca cgc ccg cac aaa gag att ttg gaa ttt cca aca cga    1557
Glu Asn Arg Thr Arg Pro His Lys Glu Ile Leu Glu Phe Pro Thr Arg
                470                 475                 480

gaa gta tat gtc cct cac act gtg tac aga aac ctt ctc tat gtc tac    1605
Glu Val Tyr Val Pro His Thr Val Tyr Arg Asn Leu Leu Tyr Val Tyr
        485                 490                 495

cca cag agg ctg aac ttt gta aac aaa cta gca tca gcc cgg aac att    1653
Pro Gln Arg Leu Asn Phe Val Asn Lys Leu Ala Ser Ala Arg Asn Ile
        500                 505                 510

aca ata aag atc cag ttt atg tgt gga gaa gat gct agc aat gcg atg    1701
Thr Ile Lys Ile Gln Phe Met Cys Gly Glu Asp Ala Ser Asn Ala Met
515                 520                 525                 530

ccg gtc atc ttt gga aaa tcc agc ggg cct gaa ttt ctg cag gaa gtg    1749
Pro Val Ile Phe Gly Lys Ser Ser Gly Pro Glu Phe Leu Gln Glu Val
                535                 540                 545

tac aca gct gtt aca tac cat aat aag tct cct gac ttt tat gaa gaa    1797
Tyr Thr Ala Val Thr Tyr His Asn Lys Ser Pro Asp Phe Tyr Glu Glu
                550                 555                 560

gtg aaa att aag ctc ccc gct aag ctc aca gta aat cac cac ctc ctg    1845
Val Lys Ile Lys Leu Pro Ala Lys Leu Thr Val Asn His His Leu Leu
                565                 570                 575

ttc acc ttc tac cat atc agc tgt cag cag aag caa gga gcc tcc gtg    1893
Phe Thr Phe Tyr His Ile Ser Cys Gln Gln Lys Gln Gly Ala Ser Val
        580                 585                 590

gaa act ctc ctg gga tat tca tgg ctg cca att ctc tta aat gaa cgt    1941
Glu Thr Leu Leu Gly Tyr Ser Trp Leu Pro Ile Leu Leu Asn Glu Arg
595                 600                 605                 610

ctt caa act gga tcc tac tgt ctc cca gtt gcc ttg gaa aaa ttg cca    1989
Leu Gln Thr Gly Ser Tyr Cys Leu Pro Val Ala Leu Glu Lys Leu Pro
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ccc att aag tgg gct gaa gga cat aag gga gta ttt aat att gaa gtg    2085
Pro Ile Lys Trp Ala Glu Gly His Lys Gly Val Phe Asn Ile Glu Val
        645                 650                 655

caa gct gtt tct tct gta cac acc cag gac aac cac ctg gag aag ttc    2133
Gln Ala Val Ser Ser Val His Thr Gln Asp Asn His Leu Glu Lys Phe
        660                 665                 670

ttc acc ctc tgc cac tcc ctg gag agc cag gtg acc ttc ccc atc cgc    2181
Phe Thr Leu Cys His Ser Leu Glu Ser Gln Val Thr Phe Pro Ile Arg
675                 680                 685                 690

gtg ctg gat cag aaa atc agc gag atg gcg ctg gag cat gag ctg aag    2229
Val Leu Asp Gln Lys Ile Ser Glu Met Ala Leu Glu His Glu Leu Lys
                695                 700                 705

ctc agc atc atc tgc ctg aac tcc tcc cgc ctg gag ccg ctc gtg ctc    2277
Leu Ser Ile Ile Cys Leu Asn Ser Ser Arg Leu Glu Pro Leu Val Leu
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ttc ctg cac ctg gtg ctg gac aag ctc ttc cag ctg tcc gtg cag ccc    2325
Phe Leu His Leu Val Leu Asp Lys Leu Phe Gln Leu Ser Val Gln Pro
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atg gtc atc gct ggc cag aca gcc aac ttc tcc cag ttt gcc ttc gag    2373
Met Val Ile Ala Gly Gln Thr Ala Asn Phe Ser Gln Phe Ala Phe Glu
        740                 745                 750

tcc gtg gtg gcc atc gcc aac agt ctg cac aac agc aag gac ctg agc    2421
Ser Val Val Ala Ile Ala Asn Ser Leu His Asn Ser Lys Asp Leu Ser
755                 760                 765                 770

aag gac cag cat ggg agg aac tgc ctg ctg gct tcc tac gtg cac tac    2469
Lys Asp Gln His Gly Arg Asn Cys Leu Leu Ala Ser Tyr Val His Tyr
                775                 780                 785

gtc ttc cgc ctg cca gag gtg caa agg gat gtg ccc aag tca ggc gct    2517
Val Phe Arg Leu Pro Glu Val Gln Arg Asp Val Pro Lys Ser Gly Ala
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ccc act gcc ctc cta gac cct cgg agc tac cac acg tat ggc cgc aca    2565
Pro Thr Ala Leu Leu Asp Pro Arg Ser Tyr His Thr Tyr Gly Arg Thr
        805                 810                 815

tca gct gct gct gtg agt tca aag ctg ctg cag gcc cgg gtg atg agc    2613
Ser Ala Ala Ala Val Ser Ser Lys Leu Leu Gln Ala Arg Val Met Ser
        820                 825                 830

agc agt aac cca gac ctc gcg ggg aca cac tcc gca gca gac gag gaa    2661
Ser Ser Asn Pro Asp Leu Ala Gly Thr His Ser Ala Ala Asp Glu Glu
835                 840                 845                 850

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Val Lys Asn Ile Met Ser Ser Lys Ile Ala Asp Arg Asn Cys Ser Arg
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gcc cca agg cca gcc agc aaa aag cat ttc cat gag gag ctt gcc ctt      2805
Ala Pro Arg Pro Ala Ser Lys Lys His Phe His Glu Glu Leu Ala Leu
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cag atg gtg gtc agc acc gga atg gtg aaa agc atg gcc cag cac gta      2853
Gln Met Val Val Ser Thr Gly Met Val Lys Ser Met Ala Gln His Val
        900             905                 910

cat aac atg gac aaa cgg gac agt ttt cgg agg act cgt ttt tct gac      2901
His Asn Met Asp Lys Arg Asp Ser Phe Arg Arg Thr Arg Phe Ser Asp
915             920                 925                 930

cgt ttc atg gat gac ata act act att gtt aat gtg gtc acc tcg gaa      2949
Arg Phe Met Asp Asp Ile Thr Thr Ile Val Asn Val Val Thr Ser Glu
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att gca gcc ctt tta gta aaa cca cag aag gaa aat gaa cag gcg gaa      2997
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aag atg aac atc agc ctg gct ttc ttc ttg tat gac ctt ctc tcc ctc     3045
Lys Met Asn Ile Ser Leu Ala Phe Phe Leu Tyr Asp Leu Leu Ser Leu
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atg gat cgg ggc ttt gtg ttt aac ctc atc aga cat tat tgc agc cag     3093
Met Asp Arg Gly Phe Val Phe Asn Leu Ile Arg His Tyr Cys Ser Gln
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ctg tca gcc aag ctc agt aac ctt cca acg ctc att tcc atg agg cta     3141
Leu Ser Ala Lys Leu Ser Asn Leu Pro Thr Leu Ile Ser Met Arg Leu
995                 1000                1005                1010

gag ttc ctg aga atc ctc tgt agc cat gag cat tac ctc aat ctg aac     3189
Glu Phe Leu Arg Ile Leu Cys Ser His Glu His Tyr Leu Asn Leu Asn
                1015                1020                1025

ctt ttt ttt atg aat gct gat act gct cca aca tct cct tgt cct tcc     3237
Leu Phe Phe Met Asn Ala Asp Thr Ala Pro Thr Ser Pro Cys Pro Ser
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ata tct tcc cag aac tca agc tcc tgc tcc agc ttc cag gac cag aag     3285
Ile Ser Ser Gln Asn Ser Ser Ser Cys Ser Ser Phe Gln Asp Gln Lys
        1045                1050                1055

atc gcc agc atg ttc gat ctg act tcc gag tac cgc cag cag cac ttc     3333
Ile Ala Ser Met Phe Asp Leu Thr Ser Glu Tyr Arg Gln Gln His Phe
        1060                1065                1070

ctc acc ggg ctc ctc ttc aca gaa ctg gct gct gcc ctg gat gcc gaa     3381
Leu Thr Gly Leu Leu Phe Thr Glu Leu Ala Ala Ala Leu Asp Ala Glu
1075                1080                1085                1090

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Gly Glu Gly Ile Ser Lys Val Gln Arg Lys Ala Val Ser Ala Ile His
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ttg gat gct ttg cca cag ctc tgt gac ttt aca gtt gca gat act cgc    3573
Leu Asp Ala Leu Pro Gln Leu Cys Asp Phe Thr Val Ala Asp Thr Arg
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aga tac cgc acc agt ggc tcg gat gaa gaa caa gaa gga gcc ggt gcc    3621
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1155                1160                1165                1170

att aac cag aat gtg gct ctg gcc ata gca ggg aat aat ttc aat ttg    3669
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aaa aca agt gga ata gtg ctg tct tcc ttg ccc tat aag cag tac aac    3717
Lys Thr Ser Gly Ile Val Leu Ser Ser Leu Pro Tyr Lys Gln Tyr Asn
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atg ctg aac gcg gac act act cgc aac ctc atg atc tgc ttc ctc tgg    3765
Met Leu Asn Ala Asp Thr Thr Arg Asn Leu Met Ile Cys Phe Leu Trp
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atc atg aaa aat gct gat cag agc ctc att agg aag tgg att gct gac    3813
Ile Met Lys Asn Ala Asp Gln Ser Leu Ile Arg Lys Trp Ile Ala Asp
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ctg cca tca acg cag ctc aac agg att tta gat cta ctt ttc atc tgt    3861
Leu Pro Ser Thr Gln Leu Asn Arg Ile Leu Asp Leu Leu Phe Ile Cys
1235                1240                1245                1250

gtg tta tgt ttt gag tat aag gga aaa cag agt tct gac aaa gtc agt    3909
Val Leu Cys Phe Glu Tyr Lys Gly Lys Gln Ser Ser Asp Lys Val Ser
                1255                1260                1265

acc caa gtc ctg cag aag tca agg gat gtc aag gcc cgg ctg gaa gag    3957
Thr Gln Val Leu Gln Lys Ser Arg Asp Val Lys Ala Arg Leu Glu Glu
        1270                1275                1280

gct ttg ctg cgt ggg gaa ggg gcc aga ggg gag atg atg cgc cgc cgg    4005
Ala Leu Leu Arg Gly Glu Gly Ala Arg Gly Glu Met Met Arg Arg Arg
        1285                1290                1295

gct cca ggg aac gac cga ttt cca ggc cta aat gaa aat ttg aga tgg    4053
Ala Pro Gly Asn Asp Arg Phe Pro Gly Leu Asn Glu Asn Leu Arg Trp
        1300                1305                1310

aag aaa gag cag aca cat tgg cgg caa gct aat gag aag cta gat aaa    4101
Lys Lys Glu Gln Thr His Trp Arg Gln Ala Asn Glu Lys Leu Asp Lys
1315                1320                1325                1330

aca aag gcc gag tta gat caa gaa gcc ttg atc agt ggc aat ctg gct    4149
Thr Lys Ala Glu Leu Asp Gln Glu Ala Leu Ile Ser Gly Asn Leu Ala
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gcg agc tcg gct ctg gac tgt aaa gac agc ctg ctg gga ggt gtt ctg    4245
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agg gtg ctg gtg aat tct ctg aac tgt gat cag agt acc acc tac ctg    4293
Arg Val Leu Val Asn Ser Leu Asn Cys Asp Gln Ser Thr Thr Tyr Leu
    1380                1385                1390

act cac tgc ttt gca aca ctc cgt gct ctc atc gcc aag ttt gga gac    4341
Thr His Cys Phe Ala Thr Leu Arg Ala Leu Ile Ala Lys Phe Gly Asp
1395                1400                1405                1410

tta ctc ttc gaa gag gag gtg gaa cag tgt ttc gac cta tgt cac caa    4389
Leu Leu Phe Glu Glu Glu Val Glu Gln Cys Phe Asp Leu Cys His Gln
                1415                1420                1425

gtc ctg cac cac tgc agc agc agc atg gat gtc acc cgg agc caa gcc    4437
Val Leu His His Cys Ser Ser Ser Met Asp Val Thr Arg Ser Gln Ala
        1430                1435                1440

tgt gcc acc ctt tac ctc ctc atg agg ttc agt ttt gga gcc acc agt    4485
Cys Ala Thr Leu Tyr Leu Leu Met Arg Phe Ser Phe Gly Ala Thr Ser
        1445                1450                1455

aat ttt gca aga gta aag atg caa gta acc atg tcc ctg gca tct ttg    4533
Asn Phe Ala Arg Val Lys Met Gln Val Thr Met Ser Leu Ala Ser Leu
    1460                1465                1470

gtg gga aga gca cca gac ttt aat gaa gag cac ctg aga aga tcc ttg    4581
Val Gly Arg Ala Pro Asp Phe Asn Glu Glu His Leu Arg Arg Ser Leu
1475                1480                1485                1490

agg aca att ttg gcc tat tca gaa gag gac aca gcc atg cag atg act    4629
Arg Thr Ile Leu Ala Tyr Ser Glu Glu Asp Thr Ala Met Gln Met Thr
                1495                1500                1505

cct ttt ccc acc cag gtg gag gaa ctt ctc tgt aat ctg aat agc atc    4677
Pro Phe Pro Thr Gln Val Glu Glu Leu Leu Cys Asn Leu Asn Ser Ile
        1510                1515                1520

tta tat gac aca gtg aaa atg agg gaa ttt cag gaa gat cct gag atg    4725
Leu Tyr Asp Thr Val Lys Met Arg Glu Phe Gln Glu Asp Pro Glu Met
        1525                1530                1535

ctt atg gat ctc atg tac aga att gcc aag agt tac cag gca tct cct    4773
Leu Met Asp Leu Met Tyr Arg Ile Ala Lys Ser Tyr Gln Ala Ser Pro
    1540                1545                1550

gat ctg cgg ctg acc tgg ctc cag aac atg gca gag aaa cac acc aag    4821
Asp Leu Arg Leu Thr Trp Leu Gln Asn Met Ala Glu Lys His Thr Lys
1555                1560                1565                1570

aag aag tgc tac acg gag gct gcc atg tgc ctg gtg cac gcc gct gcg    4869
Lys Lys Cys Tyr Thr Glu Ala Ala Met Cys Leu Val His Ala Ala Ala
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gtg ggc agt gtc agc ttc cag aat att tct tcc aat gtg ctg gag gag    4965
Val Gly Ser Val Ser Phe Gln Asn Ile Ser Ser Asn Val Leu Glu Glu
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tct gtg gtc tct gag gac acc ctg tca cct gac gag gat ggg gtg tgc    5013
Ser Val Val Ser Glu Asp Thr Leu Ser Pro Asp Glu Asp Gly Val Cys
    1620                1625                1630

gca ggc cag tac ttc acc gag agt ggc ctg gta ggc ctc ctg gag cag    5061
Ala Gly Gln Tyr Phe Thr Glu Ser Gly Leu Val Gly Leu Leu Glu Gln
1635                1640                1645                1650

gcc gcg gag ctc ttc agc acg gga ggc tta tat gag aca gtt aat gag    5109
Ala Ala Glu Leu Phe Ser Thr Gly Gly Leu Tyr Glu Thr Val Asn Glu
                1655                1660                1665

gtc tac aag ctg gtc atc ccc atc cta gaa gcg cat cga gaa ttc cgg    5157
Val Tyr Lys Leu Val Ile Pro Ile Leu Glu Ala His Arg Glu Phe Arg
            1670                1675                1680

aag ctg aca ctc act cac agc aag ctg cag aga gcc ttc gac agc atc    5205
Lys Leu Thr Leu Thr His Ser Lys Leu Gln Arg Ala Phe Asp Ser Ile
            1685                1690                1695

gtt aac aag gat cat aag aga atg ttt gga acc tac ttc cga gtt ggt    5253
Val Asn Lys Asp His Lys Arg Met Phe Gly Thr Tyr Phe Arg Val Gly
    1700                1705                1710

ttc ttt gga tcc aaa ttt ggg gat ttg gat gaa cag gag ttt gtc tac    5301
Phe Phe Gly Ser Lys Phe Gly Asp Leu Asp Glu Gln Glu Phe Val Tyr
1715                1720                1725                1730

aaa gag cct gca att acc aag ctt cct gag atc tca cat aga cta gag    5349
Lys Glu Pro Ala Ile Thr Lys Leu Pro Glu Ile Ser His Arg Leu Glu
                1735                1740                1745

gca ttt tat ggt caa tgt ttt ggt gca gaa ttt gtg gaa gtg att aaa    5397
Ala Phe Tyr Gly Gln Cys Phe Gly Ala Glu Phe Val Glu Val Ile Lys
            1750                1755                1760

gac tcc act cct gtg gac aaa acc aag ttg gat cct aac aag gcc tac    5445
Asp Ser Thr Pro Val Asp Lys Thr Lys Leu Asp Pro Asn Lys Ala Tyr
            1765                1770                1775

ata cag atc act ttt gtg gag ccc tac ttt gat gag tat gag atg aaa    5493
Ile Gln Ile Thr Phe Val Glu Pro Tyr Phe Asp Glu Tyr Glu Met Lys
    1780                1785                1790

gac agg gtc aca tac ttt gag aag aat ttc aac ctc cgg agg ttc atg    5541
Asp Arg Val Thr Tyr Phe Glu Lys Asn Phe Asn Leu Arg Arg Phe Met
1795                1800                1805                1810

tac acc acc ccg ttc acc ctg gag ggg cgg cct cgg gga gag ctg cat    5589
Tyr Thr Thr Pro Phe Thr Leu Glu Gly Arg Pro Arg Gly Glu Leu His
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tac atc aag acc agg atc agc gtc atc cag aag gag gag ttt gtt ttg   5685
Tyr Ile Lys Thr Arg Ile Ser Val Ile Gln Lys Glu Glu Phe Val Leu
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aca ccg att gaa gtt gcc att gaa gac atg aag aag aag acc ctg cag   5733
Thr Pro Ile Glu Val Ala Ile Glu Asp Met Lys Lys Lys Thr Leu Gln
        1860                1865                1870

tta gca gtt gcc att aac cag gag ccg cct gat gca aag atg ctt cag   5781
Leu Ala Val Ala Ile Asn Gln Glu Pro Pro Asp Ala Lys Met Leu Gln
1875                1880                1885                1890

atg gtg ctg caa ggc tct gtg gga gct act gta aat cag gga cca ctg   5829
Met Val Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln Gly Pro Leu
                1895                1900                1905

gaa gta gcc caa gtg ttt ttg gct gaa att cct gct gat cca aaa ctc   5877
Glu Val Ala Gln Val Phe Leu Ala Glu Ile Pro Ala Asp Pro Lys Leu
            1910                1915                1920

tat cga cat cac aac aag ttg agg tta tgc ttt aag gaa ttc atc atg   5925
Tyr Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Glu Phe Ile Met
        1925                1930                1935

aga tgt ggt gaa gct gta gag aaa aac aag cgt ctc atc acg gca gac   5973
Arg Cys Gly Glu Ala Val Glu Lys Asn Lys Arg Leu Ile Thr Ala Asp
        1940                1945                1950

cag agg gaa tat cag cag gaa ctc aaa aag aac tat aac aag cta aaa   6021
Gln Arg Glu Tyr Gln Gln Glu Leu Lys Lys Asn Tyr Asn Lys Leu Lys
1955                1960                1965                1970

gag aac ctc agg cca atg atc gag cgg aaa att cca gaa ctg tac aag   6069
Glu Asn Leu Arg Pro Met Ile Glu Arg Lys Ile Pro Glu Leu Tyr Lys
                1975                1980                1985

cca ata ttc aga gtt gag agt caa aag agg gac tcc ttc cac aga tct   6117
Pro Ile Phe Arg Val Glu Ser Gln Lys Arg Asp Ser Phe His Arg Ser
                1990                1995                2000

agt ttc agg aaa tgt gaa acc cag ttg tca cag ggc agc taa   6159
Ser Phe Arg Lys Cys Glu Thr Gln Leu Ser Gln Gly Ser
        2005                2010                2015

gaaaagccat cttcattcgt ggagactgtg gccctgcaac cctggagaag gacttgctgg   6219

tacttaaaaa atgggacatt tgccacccag gactgactgt acactccctg atcagccagc   6279

actctggaag ctttgggatc ccaggaacca tggaattatt cccaaatgga ctctgaccag   6339

atttttgcca tactgggggg tggcgggatg gaggatgggt actcaggcat gactgcgtat   6399

ttattaaagt gtgtttttcc acaatgtacc aaacaaggca taagcagctt ctcctgctga   6459
```

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attatttgtg aacttgttac ccttttggta atggtggact aattgctgta tagttatttt 6759

tgttttatta ttactgttac attaatttaa catgcattta tagaagaata cattcaaagc 6819

actgatgtag gagatacacg gtacttggag cagtcagcca aaaatcacag atactgcttt 6879

cacttaaatg gaaacaattc tccgataatg ctttgctttt tttcttatgt cactcttgtg 6939

tactatctat ttttctcctc tctgggacca agtttctttt tataaagcaa taatatctct 6999

gttttcattt cagaacattg tgctgtctgt cagcatatgt atatcagcta caaaatatat 7059

tcaactttga cttcttttga caaaggactt taggaaaagg aggaacaaag acattatttg 7119

agaattaaat tatatatttt taatatgact gtgaccttga ctgataataa agatgtaata 7179

agaattgcaa gctaaaaaaa aaaaaaaaa aactcg                              7215
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 1               5                  10                  15

Asp Phe Thr Asp Asp Asp Leu Asp Val Val Phe Thr Pro Lys Glu Cys
             20                  25                  30

Arg Thr Leu Gln Pro Ser Leu Pro Glu Glu Gly Val Glu Leu Asp Pro
         35                  40                  45

His Val Arg Asp Cys Val Gln Thr Tyr Ile Arg Glu Trp Leu Ile Val
     50                  55                  60

Asn Arg Lys Asn Gln Gly Ser Pro Glu Ile Cys Gly Phe Lys Lys Thr
 65                  70                  75                  80

Gly Ser Arg Lys Asp Phe His Lys Thr Leu Pro Lys Gln Thr Phe Glu
                 85                  90                  95

Ser Glu Thr Leu Glu Cys Ser Glu Pro Ala Ala Gln Ala Gly Pro Arg
             100                 105                 110

His Leu Asn Val Leu Cys Asp Val Ser Gly Lys Gly Pro Val Thr Ala
             115                 120                 125

Cys Asp Phe Asp Leu Arg Ser Leu Gln Pro Asp Lys Arg Leu Glu Asn
     130                 135                 140

Leu Leu Gln Gln Val Ser Ala Glu Asp Phe Glu Lys Gln Asn Glu Glu
```

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Val Arg Glu Glu Arg Ala Val Glu Ile Arg Trp Val Pro Glu Cys Pro
                 180                 185                 190
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Lys Glu His Leu Gly Asn Arg Ile Leu Val Lys Leu Leu Thr Leu Lys
195   200   205

Phe Glu Ile Glu Ile Glu Pro Leu Phe Ala Ser Ile Ala Leu Tyr Asp
210   215   220

Val Lys Glu Arg Lys Lys Ile Ser Glu Asn Phe His Cys Asp Leu Asn
225   230   235   240

Ser Asp Gln Phe Lys Gly Phe Leu Arg Ala His Thr Pro Ser Val Ala
245   250   255

Ala Ser Ser Gln Ala Arg Ser Ala Val Phe Ser Val Thr Tyr Pro Ser
260   265   270

Ser Asp Ile Tyr Leu Val Val Lys Ile Glu Lys Val Leu Gln Gln Gly
275   280   285

Asp Ile Gly Asp Cys Ala Glu Pro Tyr Thr Val Ile Lys Glu Ser Asp
290   295   300

Gly Gly Lys Ser Lys Glu Lys Ile Glu Lys Leu Lys Leu Gln Ala Glu
305   310   315   320

Ser Phe Cys Gln Arg Leu Gly Lys Tyr Arg Met Pro Phe Ala Trp Ala
325   330   335

Pro Ile Ser Leu Ser Ser Phe Phe Asn Val Ser Thr Leu Glu Arg Glu
340   345   350

Val Thr Asp Val Asp Ser Val Val Gly Arg Ser Pro Val Gly Glu Arg
355   360   365

Arg Thr Leu Ala Gln Ser Arg Arg Leu Ser Glu Arg Ala Leu Ser Leu
370   375   380

Glu Glu Asn Gly Val Gly Ser Asn Phe Lys Thr Ser Thr Leu Ser Val
385   390   395   400

Ser Ser Phe Phe Lys Gln Glu Gly Asp Arg Leu Ser Asp Glu Asp Leu
405   410   415

Phe Lys Phe Leu Ala Asp Tyr Lys Arg Ser Ser Ser Leu Gln Arg Arg
420   425   430

Val Lys Ser Ile Pro Gly Leu Leu Arg Leu Glu Ile Ser Thr Ala Pro
435   440   445

Glu Ile Ile Asn Cys Cys Leu Thr Pro Glu Met Leu Pro Val Lys Pro
450   455   460

Phe Pro Glu Asn Arg Thr Arg Pro His Lys Glu Ile Leu Glu Phe Pro
465   470   475   480

Asn Ile Thr Ile Lys Ile Gln Phe Met Cys Gly Glu Asp Ala Ser Asn
        515   520   525

Ala Met Pro Val Ile Phe Gly Lys Ser Ser Gly Pro Glu Phe Leu Gln
        530   535   540

Glu Val Tyr Thr Ala Val Thr Tyr His Asn Lys Ser Pro Asp Phe Tyr
545   550   555   560

Glu Glu Val Lys Ile Lys Leu Pro Ala Lys Leu Thr Val Asn His His
                565   570   575

Leu Leu Phe Thr Phe Tyr His Ile Ser Cys Gln Gln Lys Gln Gly Ala
            580   585   590

Ser Val Glu Thr Leu Leu Gly Tyr Ser Trp Leu Pro Ile Leu Leu Asn
        595   600   605

Glu Arg Leu Gln Thr Gly Ser Tyr Cys Leu Pro Val Ala Leu Glu Lys
    610   615   620

Leu Pro Pro Asn Tyr Ser Met His Ser Ala Glu Lys Val Pro Leu Gln
625   630   635   640

Asn Pro Pro Ile Lys Trp Ala Glu Gly His Lys Gly Val Phe Asn Ile
                645   650   655

Glu Val Gln Ala Val Ser Ser Val His Thr Gln Asp Asn His Leu Glu
            660   665   670

Lys Phe Phe Thr Leu Cys His Ser Leu Glu Ser Gln Val Thr Phe Pro
            675   680   685

Ile Arg Val Leu Asp Gln Lys Ile Ser Glu Met Ala Leu Glu His Glu
    690   695   700

Leu Lys Leu Ser Ile Ile Cys Leu Asn Ser Ser Arg Leu Glu Pro Leu
705   710   715   720

Val Leu Phe Leu His Leu Val Leu Asp Lys Leu Phe Gln Leu Ser Val
            725   730   735

Gln Pro Met Val Ile Ala Gly Gln Thr Ala Asn Phe Ser Gln Phe Ala
            740   745   750

Phe Glu Ser Val Val Ala Ile Ala Asn Ser Leu His Asn Ser Lys Asp
        755   760   765

Leu Ser Lys Asp Gln His Gly Arg Asn Cys Leu Leu Ala Ser Tyr Val
        770   775   780

His Tyr Val Phe Arg Leu Pro Glu Val Gln Arg Asp Val Pro Lys Ser
785   790   795   800

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Met Ser Ser Ser Asn Pro Asp Leu Ala Gly Thr His Ser Ala Ala Asp
        835             840                 845

Glu Glu Val Lys Asn Ile Met Ser Ser Lys Ile Ala Asp Arg Asn Cys
    850             855                 860

Ser Arg Met Ser Tyr Tyr Cys Ser Gly Ser Ser Asp Ala Pro Ser Ser
865             870                 875                 880

Pro Ala Ala Pro Arg Pro Ala Ser Lys Lys His Phe His Glu Glu Leu
            885             890                 895

Ala Leu Gln Met Val Val Ser Thr Gly Met Val Lys Ser Met Ala Gln
            900             905                 910

His Val His Asn Met Asp Lys Arg Asp Ser Phe Arg Arg Thr Arg Phe
    915             920                 925

Ser Asp Arg Phe Met Asp Asp Ile Thr Thr Ile Val Asn Val Val Thr
    930             935                 940

Ser Glu Ile Ala Ala Leu Leu Val Lys Pro Gln Lys Glu Asn Glu Gln
945             950                 955                 960

Ala Glu Lys Met Asn Ile Ser Leu Ala Phe Phe Leu Tyr Asp Leu Leu
            965             970                 975

Ser Leu Met Asp Arg Gly Phe Val Phe Asn Leu Ile Arg His Tyr Cys
            980             985                 990

Ser Gln Leu Ser Ala Lys Leu Ser Asn Leu Pro Thr Leu Ile Ser Met
            995             1000                1005

Arg Leu Glu Phe Leu Arg Ile Leu Cys Ser His Glu His Tyr Leu Asn
    1010            1015                1020

Leu Asn Leu Phe Phe Met Asn Ala Asp Thr Ala Pro Thr Ser Pro Cys
1025                1030                1035                1040

Pro Ser Ile Ser Ser Gln Asn Ser Ser Ser Cys Ser Ser Phe Gln Asp
            1045                1050                1055

Gln Lys Ile Ala Ser Met Phe Asp Leu Thr Ser Glu Tyr Arg Gln Gln
            1060            1065                1070

His Phe Leu Thr Gly Leu Leu Phe Thr Glu Leu Ala Ala Ala Leu Asp
    1075                1080                1085

Ala Glu Gly Glu Gly Ile Ser Lys Val Gln Arg Lys Ala Val Ser Ala
    1090                1095                1100

Ile His Ser Leu Leu Ser Ser His Asp Leu Asp Pro Arg Cys Val Lys
1105                1110                1115                1120
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Thr Arg Arg Tyr Arg Thr Ser Gly Ser Asp Glu Glu Gln Glu Gly Ala
    1155   1160   1165

Gly Ala Ile Asn Gln Asn Val Ala Leu Ala Ile Ala Gly Asn Asn Phe
    1170   1175   1180

Asn Leu Lys Thr Ser Gly Ile Val Leu Ser Ser Leu Pro Tyr Lys Gln
1185   1190   1195   1200

Tyr Asn Met Leu Asn Ala Asp Thr Thr Arg Asn Leu Met Ile Cys Phe
    1205   1210   1215

Leu Trp Ile Met Lys Asn Ala Asp Gln Ser Leu Ile Arg Lys Trp Ile
    1220   1225   1230

Ala Asp Leu Pro Ser Thr Gln Leu Asn Arg Ile Leu Asp Leu Leu Phe
    1235   1240   1245

Ile Cys Val Leu Cys Phe Glu Tyr Lys Gly Lys Gln Ser Ser Asp Lys
    1250   1255   1260

Val Ser Thr Gln Val Leu Gln Lys Ser Arg Asp Val Lys Ala Arg Leu
1265   1270   1275   1280

Glu Glu Ala Leu Leu Arg Gly Glu Gly Ala Arg Gly Glu Met Met Arg
    1285   1290   1295

Arg Arg Ala Pro Gly Asn Asp Arg Phe Pro Gly Leu Asn Glu Asn Leu
    1300   1305   1310

Arg Trp Lys Lys Glu Gln Thr His Trp Arg Gln Ala Asn Glu Lys Leu
    1315   1320   1325

Asp Lys Thr Lys Ala Glu Leu Asp Gln Glu Ala Leu Ile Ser Gly Asn
    1330   1335   1340

Leu Ala Thr Glu Ala His Leu Ile Ile Leu Asp Met Gln Glu Asn Ile
1345   1350   1355   1360

Ile Gln Ala Ser Ser Ala Leu Asp Cys Lys Asp Ser Leu Leu Gly Gly
    1365   1370   1375

Val Leu Arg Val Leu Val Asn Ser Leu Asn Cys Asp Gln Ser Thr Thr
    1380   1385   1390

Tyr Leu Thr His Cys Phe Ala Thr Leu Arg Ala Leu Ile Ala Lys Phe
    1395   1400   1405

Gly Asp Leu Leu Phe Glu Glu Glu Val Glu Gln Cys Phe Asp Leu Cys
    1410   1415   1420

His Gln Val Leu His His Cys Ser Ser Ser Met Asp Val Thr Arg Ser
1425   1430   1435   1440

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Ser Leu Val Gly Arg Ala Pro Asp Phe Asn Glu Glu His Leu Arg Arg
        1475                1480                1485

Ser Leu Arg Thr Ile Leu Ala Tyr Ser Glu Glu Asp Thr Ala Met Gln
        1490                1495                1500

Met Thr Pro Phe Pro Thr Gln Val Glu Glu Leu Leu Cys Asn Leu Asn
1505                1510                1515                1520

Ser Ile Leu Tyr Asp Thr Val Lys Met Arg Glu Phe Gln Glu Asp Pro
        1525                1530                1535

Glu Met Leu Met Asp Leu Met Tyr Arg Ile Ala Lys Ser Tyr Gln Ala
        1540                1545                1550

Ser Pro Asp Leu Arg Leu Thr Trp Leu Gln Asn Met Ala Glu Lys His
        1555                1560                1565

Thr Lys Lys Lys Cys Tyr Thr Glu Ala Ala Met Cys Leu Val His Ala
        1570                1575                1580

Ala Ala Leu Val Ala Glu Tyr Leu Ser Met Leu Glu Asp His Ser Tyr
1585                1590                1595                1600

Leu Pro Val Gly Ser Val Ser Phe Gln Asn Ile Ser Ser Asn Val Leu
        1605                1610                1615

Glu Glu Ser Val Val Ser Glu Asp Thr Leu Ser Pro Asp Glu Asp Gly
        1620                1625                1630

Val Cys Ala Gly Gln Tyr Phe Thr Glu Ser Gly Leu Val Gly Leu Leu
        1635                1640                1645

Glu Gln Ala Ala Glu Leu Phe Ser Thr Gly Gly Leu Tyr Glu Thr Val
        1650                1655                1660

Asn Glu Val Tyr Lys Leu Val Ile Pro Ile Leu Glu Ala His Arg Glu
1665                1670                1675                1680

Phe Arg Lys Leu Thr Leu Thr His Ser Lys Leu Gln Arg Ala Phe Asp
        1685                1690                1695

Ser Ile Val Asn Lys Asp His Lys Arg Met Phe Gly Thr Tyr Phe Arg
        1700                1705                1710

Val Gly Phe Phe Gly Ser Lys Phe Gly Asp Leu Asp Glu Gln Glu Phe
        1715                1720                1725

Val Tyr Lys Glu Pro Ala Ile Thr Lys Leu Pro Glu Ile Ser His Arg
        1730                1735                1740

Leu Glu Ala Phe Tyr Gly Gln Cys Phe Gly Ala Glu Phe Val Glu Val
        1745                1750                1755                1760
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Met Lys Asp Arg Val Thr Tyr Phe Glu Lys Asn Phe Asn Leu Arg Arg
    1795   1800   1805

Phe Met Tyr Thr Thr Pro Phe Thr Leu Glu Gly Arg Pro Arg Gly Glu
    1810   1815   1820

Leu His Glu Gln Tyr Arg Arg Asn Thr Val Leu Thr Thr Met His Ala
1825   1830   1835   1840

Phe Pro Tyr Ile Lys Thr Arg Ile Ser Val Ile Gln Lys Glu Glu Phe
                1845   1850   1855

Val Leu Thr Pro Ile Glu Val Ala Ile Glu Asp Met Lys Lys Lys Thr
                1860   1865   1870

Leu Gln Leu Ala Val Ala Ile Asn Gln Glu Pro Pro Asp Ala Lys Met
                1875   1880   1885

Leu Gln Met Val Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln Gly
    1890   1895   1900

Pro Leu Glu Val Ala Gln Val Phe Leu Ala Glu Ile Pro Ala Asp Pro
1905   1910   1915   1920

Lys Leu Tyr Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Glu Phe
                1925   1930   1935

Ile Met Arg Cys Gly Glu Ala Val Glu Lys Asn Lys Arg Leu Ile Thr
    1940   1945   1950

Ala Asp Gln Arg Glu Tyr Gln Gln Glu Leu Lys Lys Asn Tyr Asn Lys
    1955   1960   1965

Leu Lys Glu Asn Leu Arg Pro Met Ile Glu Arg Lys Ile Pro Glu Leu
    1970   1975   1980

Tyr Lys Pro Ile Phe Arg Val Glu Ser Gln Lys Arg Asp Ser Phe His
1985   1990   1995   2000

Arg Ser Ser Phe Arg Lys Cys Glu Thr Gln Leu Ser Gln Gly Ser
            2005   2010   2015

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Ser Ser Gln Asn Ser Ser Ser Cys Ser Ser Phe Gln Asp Gln Lys Ile
            20                      25                  30

gcc agc atg ttc gat cgg act tcc aga gta ccc gcc agc agc act tcc     144
Ala Ser Met Phe Asp Arg Thr Ser Arg Val Pro Ala Ser Ser Thr Ser
            35                      40                  45

tca ccg ggg ctc ctc ttc aca gaa ctg gct gct gcc ctg gat gcc gaa     192
Ser Pro Gly Leu Leu Phe Thr Glu Leu Ala Ala Ala Leu Asp Ala Glu
            50                      55                  60

ggg gaa gga atc agc gaa gta caa agg aaa gct gtc agt gca att cac     240
Gly Glu Gly Ile Ser Glu Val Gln Arg Lys Ala Val Ser Ala Ile His
65                      70                  75                  80

agc ctg cta agt tct cac gac ctg gac cca cgc tgt gtc aaa cca gag     288
Ser Leu Leu Ser Ser His Asp Leu Asp Pro Arg Cys Val Lys Pro Glu
                85                      90                  95

gtg aag gtc aaa atc gcc gcc ctt tac cta cct tta gtt ggc atc att     336
Val Lys Val Lys Ile Ala Ala Leu Tyr Leu Pro Leu Val Gly Ile Ile
                100                     105                 110

ttg gat gct ttg cca cag ctc tgt gac ttt aca gtt gca gat act cgc     384
Leu Asp Ala Leu Pro Gln Leu Cys Asp Phe Thr Val Ala Asp Thr Arg
            115                     120                 125

aga tac cgc acc agt ggc tcg gat gaa gaa caa gaa gga gcc ggt gcc     432
Arg Tyr Arg Thr Ser Gly Ser Asp Glu Glu Gln Glu Gly Ala Gly Ala
            130                     135                 140

att acc cag aat gtg gct ctg gcc ata gca ggg aat aat ttc aat ttg     480
Ile Thr Gln Asn Val Ala Leu Ala Ile Ala Gly Asn Asn Phe Asn Leu
145                     150                 155                 160

aaa aca agt gga ata gtg ctg tct tcc ttg ccc tat aag cag tac aac     528
Lys Thr Ser Gly Ile Val Leu Ser Ser Leu Pro Tyr Lys Gln Tyr Asn
                165                     170                 175

atg ctg aac gcg gac act act cgc aac ctc atg atc tgc ttc ctc tgg     576
Met Leu Asn Ala Asp Thr Thr Arg Asn Leu Met Ile Cys Phe Leu Trp
                180                     185                 190

atc atg aaa aat gct gat cag agc ctc att agg aag tgg att gct gac     624
Ile Met Lys Asn Ala Asp Gln Ser Leu Ile Arg Lys Trp Ile Ala Asp
                195                     200                 205

ctg cca tca acg cag ctc aac agg att tta gat cta ctt ttc atc tgt     672
Leu Pro Ser Thr Gln Leu Asn Arg Ile Leu Asp Leu Leu Phe Ile Cys
            210                     215                 220

gtg tta tgt ttt gag tat aag gga aaa cag agt tct gac aaa gtc agt     720
Val Leu Cys Phe Glu Tyr Lys Gly Lys Gln Ser Ser Asp Lys Val Ser
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gct ttg ctg cgt ggg gaa ggg gcc aga ggg gag atg atg cgc cgc cgg    816
Ala Leu Leu Arg Gly Glu Gly Ala Arg Gly Glu Met Met Arg Arg Arg
            260             265             270

gct cca ggg aac gac cga ttt cca ggc cta aat gaa aat ttg aga tgg    864
Ala Pro Gly Asn Asp Arg Phe Pro Gly Leu Asn Glu Asn Leu Arg Trp
            275             280             285

aag aaa gag cag aca cat tgg cgg caa gct aat gag aag cta gat aaa    912
Lys Lys Glu Gln Thr His Trp Arg Gln Ala Asn Glu Lys Leu Asp Lys
            290             295             300

aca aag gcc gag tta gat caa gaa gcc ttg atc agt ggc aat ctg gct    960
Thr Lys Ala Glu Leu Asp Gln Glu Ala Leu Ile Ser Gly Asn Leu Ala
305             310             315             320

aca gaa gca cat tta atc atc ctg gat atg cag gaa aac att atc cag    1008
Thr Glu Ala His Leu Ile Ile Leu Asp Met Gln Glu Asn Ile Ile Gln
                325             330             335

gcg agc tcg gct ctg gac tgt aaa gac agc ctg ctg gga ggt gtt ctg    1056
Ala Ser Ser Ala Leu Asp Cys Lys Asp Ser Leu Leu Gly Gly Val Leu
            340             345             350

agg gtg ctg gtg aat tct ctg aac tgt gat cag agt acc acc tac ctg    1104
Arg Val Leu Val Asn Ser Leu Asn Cys Asp Gln Ser Thr Thr Tyr Leu
            355             360             365

act cac tgc ttt gca aca ctc cgt gct ctc atc gcc aag ttt gga gac    1152
Thr His Cys Phe Ala Thr Leu Arg Ala Leu Ile Ala Lys Phe Gly Asp
            370             375             380

tta ctc ttc gaa gag gag gtg gaa cag tgt ttc gac cta tgt cac caa    1200
Leu Leu Phe Glu Glu Glu Val Glu Gln Cys Phe Asp Leu Cys His Gln
385             390             395             400

gtc ctg cac cac tgc agc agc agc atg gat gtc acc cgg agc caa gcc    1248
Val Leu His His Cys Ser Ser Ser Met Asp Val Thr Arg Ser Gln Ala
            405             410             415

tgt gcc acc ctt tac ctc ctc atg agg ttc agt ttt gga gcc acc agt    1296
Cys Ala Thr Leu Tyr Leu Leu Met Arg Phe Ser Phe Gly Ala Thr Ser
            420             425             430

aat ttt gca aga gta aag atg caa gta acc atg tcc ctg gca tct ttg    1344
Asn Phe Ala Arg Val Lys Met Gln Val Thr Met Ser Leu Ala Ser Leu
            435             440             445

gtg gga aga gca cca gac ttt aat gaa gag cac ctg aga aga tcc ttg    1392
Val Gly Arg Ala Pro Asp Phe Asn Glu Glu His Leu Arg Arg Ser Leu
            450             455             460

agg aca att ttg gcc tat tca gaa gag gac aca gcc atg cag atg act    1440
Arg Thr Ile Leu Ala Tyr Ser Glu Glu Asp Thr Ala Met Gln Met Thr
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tta tat gac aca gtg aaa atg agg gaa ttt cag gaa gat cct gag atg      1536
Leu Tyr Asp Thr Val Lys Met Arg Glu Phe Gln Glu Asp Pro Glu Met
        500                 505                 510

ctt atg gat ctc atg tac aga att gcc aag agt tac cag gca tct cct      1584
Leu Met Asp Leu Met Tyr Arg Ile Ala Lys Ser Tyr Gln Ala Ser Pro
        515                 520                 525

gat ctg cgg ctg acc tgg ctc cag aac atg gca gag aaa cac acc aag      1632
Asp Leu Arg Leu Thr Trp Leu Gln Asn Met Ala Glu Lys His Thr Lys
        530                 535                 540

aag aag tgc tac acg gag gct gcc atg tgc ctg gtg cac gcc gct gcg      1680
Lys Lys Cys Tyr Thr Glu Ala Ala Met Cys Leu Val His Ala Ala Ala
545                 550                 555                 560

tta gtg gct gag tat ctg agc atg ctg gag gac cac agc tac ctg ccc      1728
Leu Val Ala Glu Tyr Leu Ser Met Leu Glu Asp His Ser Tyr Leu Pro
                565                 570                 575

gtg ggc agt gtc agc ttc cag aat att tct tcc aat gtg ctg gag gag      1776
Val Gly Ser Val Ser Phe Gln Asn Ile Ser Ser Asn Val Leu Glu Glu
                580                 585                 590

tct gtg gtc tct gag gac acc ctg tca cct gac gag gat ggg gtg tgc      1824
Ser Val Val Ser Glu Asp Thr Leu Ser Pro Asp Glu Asp Gly Val Cys
                595                 600                 605

gca ggc cag tac ttc acc gag agt ggc ctg gta ggc ctc ctg gag cag      1872
Ala Gly Gln Tyr Phe Thr Glu Ser Gly Leu Val Gly Leu Leu Glu Gln
        610                 615                 620

gcc gcg gag ctc ttc agc acg gga ggc tta tat gag aca gtt aat gag      1920
Ala Ala Glu Leu Phe Ser Thr Gly Gly Leu Tyr Glu Thr Val Asn Glu
625                 630                 635                 640

gtc tac aag ctg gtc atc ccc atc cta gaa gcg cat cga gaa ttc cgg      1968
Val Tyr Lys Leu Val Ile Pro Ile Leu Glu Ala His Arg Glu Phe Arg
                645                 650                 655

aag ctg aca ctc act cac agc aag ctg cag aga gcc ttc gac agc atc      2016
Lys Leu Thr Leu Thr His Ser Lys Leu Gln Arg Ala Phe Asp Ser Ile
                660                 665                 670

gtt aac aag gat cat aag aga atg ttt gga acc tac ttc cga gtt ggt      2064
Val Asn Lys Asp His Lys Arg Met Phe Gly Thr Tyr Phe Arg Val Gly
                675                 680                 685

ttc ttt gga tcc aaa ttt ggg gat ttg gat gaa cag gag ttt gtc tac      2112
Phe Phe Gly Ser Lys Phe Gly Asp Leu Asp Glu Gln Glu Phe Val Tyr
        690                 695                 700

aaa gag cct gca att acc aag ctt cct gag atc tca cat aga cta gag      2160
Lys Glu Pro Ala Ile Thr Lys Leu Pro Glu Ile Ser His Arg Leu Glu
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gac tcc act cct gtg gac aaa acc aag ttg gat cct aac aag gcc tac      2256
Asp Ser Thr Pro Val Asp Lys Thr Lys Leu Asp Pro Asn Lys Ala Tyr
            740                 745                 750

ata cag atc act ttt gtg gag ccc tac ttt gat gag tat gag atg aaa      2304
Ile Gln Ile Thr Phe Val Glu Pro Tyr Phe Asp Glu Tyr Glu Met Lys
            755                 760                 765

gac agg gtc aca tac ttt gag aag aat ttc aac ctc cgg agg ttc atg      2352
Asp Arg Val Thr Tyr Phe Glu Lys Asn Phe Asn Leu Arg Arg Phe Met
            770                 775                 780

tac acc acc ccg ttc acc ctg gag ggg cgg cct cgg gga gag ctg cat      2400
Tyr Thr Thr Pro Phe Thr Leu Glu Gly Arg Pro Arg Gly Glu Leu His
785                 790                 795                 800

gag cag tac aga agg aac aca gtc ctg acc act atg cac gcc ttc ccc      2448
Glu Gln Tyr Arg Arg Asn Thr Val Leu Thr Thr Met His Ala Phe Pro
                    805                 810                 815

tac atc aag acc agg atc agc gtc atc cag aag gag gag ttt gtt ttg      2496
Tyr Ile Lys Thr Arg Ile Ser Val Ile Gln Lys Glu Glu Phe Val Leu
            820                 825                 830

aca ccg att gaa gtt gcc att gaa gac atg aag aag aag acc ctg cag      2544
Thr Pro Ile Glu Val Ala Ile Glu Asp Met Lys Lys Lys Thr Leu Gln
            835                 840                 845

tta gca gtt gcc att aac cag gag ccg cct gat gca aag atg ctt cag      2592
Leu Ala Val Ala Ile Asn Gln Glu Pro Pro Asp Ala Lys Met Leu Gln
            850                 855                 860

atg gtg ctg caa ggc tct gtg gga gct act gta aat cag gga cca ctg      2640
Met Val Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln Gly Pro Leu
865                 870                 875                 880

gaa gta gcc caa gtg ttt ttg gct gaa att cct gct gat cca aaa ctc      2688
Glu Val Ala Gln Val Phe Leu Ala Glu Ile Pro Ala Asp Pro Lys Leu
                    885                 890                 895

tat cga cat cac aac aag ttg agg tta tgc ttt aag gaa ttc atc atg      2736
Tyr Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Glu Phe Ile Met
            900                 905                 910

aga tgt ggt gaa gct gta gag aaa aac aag cgt ctc atc acg gca gac      2784
Arg Cys Gly Glu Ala Val Glu Lys Asn Lys Arg Leu Ile Thr Ala Asp
            915                 920                 925

cag agg gaa tat cag cag gaa ctc aaa aag aac tat aac aag cta aaa      2832
Gln Arg Glu Tyr Gln Gln Glu Leu Lys Lys Asn Tyr Asn Lys Leu Lys
            930                 935                 940

gag aac ctc agg cca atg atc gag cgg aaa att cca gaa ctg tac aag      2880
Glu Asn Leu Arg Pro Met Ile Glu Arg Lys Ile Pro Glu Leu Tyr Lys
```

```
agt ttc agg aaa tgt gaa acc cag ttg tca cag ggc agc taa gaa aag   2976
Ser Phe Arg Lys Cys Glu Thr Gln Leu Ser Gln Gly Ser     Glu Lys
            980             985                 990

cca tct tca ttc gtg gag act gtg gcc ctg caa ccc tgg aga agg act   3024
Pro Ser Ser Phe Val Glu Thr Val Ala Leu Gln Pro Trp Arg Arg Thr
            995             1000                1005

tgc tgg tac tta aaa aat ggg aca ttt gcc acc cag gac tga           3056
Cys Trp Tyr Leu Lys Asn Gly Thr Phe Ala Thr Gln Asp
    1010            1015                1020

ctgtacactc cctgatcagc cagcactctg gaagctttgg gatcccagga accatggaat 3126

tattcccaaa tggactctga ccagattttt gccatactgg ggggtggcgg gatggaggat 3186

gggtactcag gcatgactgc gtatttatta aagtgtgttt ttccacaatg taccaaacaa 3246

ggcataagca gcttctcctg ctgactggcc aatcactgcc catctgagag atgatttcct 3306

ctggcccata tttgaattta ttggagtaac tcaaattgcc tgaggaaaaa tggaaaaatt 3366

atccaccagt cgattcaaac tgaatttcac tctttatagg aaggcagggc aaacttgtag 3426

gagtacgaaa cattttcaat aaatctacaa agggaagcct tactacaatt ccaaaaatca 3486

tcatggttgg aaatttggga ggagattatt tgtgaacttg ttaccctttt ggtaatggtg 3546

gactaattgc tgtatagtta tttttgtttt attattactg ttacattaat ttaacatgca 3606

tttatagaag aatacattca aagcactgat gtaggagata cacggtactt ggagcagtca 3666

gccaaaaatc acagatactg ctttcactta aatggaaaca attctccgat aatgctttgc 3726

ttttttctt atgtcactct tgtgtactat ctatttttct cctctctggg accaagtttc 3786

tttttataaa gcaataatat ctctgttttc atttcagaac attgtgctgt ctgtcagcat 3846

atgtatatca gctacaaaat atattcaact ttgacttctt ttgacaaagg actttaggaa 3906

aaggaggaac aaagacatta tttgagaatt aaattatata tttttaatat gactgtgacc 3956

ttgactgata ataaagatgt aataagaatt gcaagctaaa aaaaaaaaa aaaaactcg 4026


<210> 4
<211> 989
<212> PRT
<213> Homo sapiens
<223> preliminary human CLASP-5

<400> 4
Ser Thr Met Asn Ala Asp Thr Ala Pro Thr Ser Pro Cys Pro Ser Ile
  1               5                   10                  15
```

```
Ser Pro Gly Leu Leu Phe Thr Glu Leu Ala Ala Ala Leu Asp Ala Glu
    50                  55              60

Gly Glu Gly Ile Ser Glu Val Gln Arg Lys Ala Val Ser Ala Ile His
65                  70              75                  80

Ser Leu Leu Ser Ser His Asp Leu Asp Pro Arg Cys Val Lys Pro Glu
                85              90                  95

Val Lys Val Lys Ile Ala Ala Leu Tyr Leu Pro Leu Val Gly Ile Ile
            100             105             110

Leu Asp Ala Leu Pro Gln Leu Cys Asp Phe Thr Val Ala Asp Thr Arg
        115             120             125

Arg Tyr Arg Thr Ser Gly Ser Asp Glu Glu Gln Glu Gly Ala Gly Ala
    130             135             140

Ile Thr Gln Asn Val Ala Leu Ala Ile Ala Gly Asn Asn Phe Asn Leu
145             150             155             160

Lys Thr Ser Gly Ile Val Leu Ser Ser Leu Pro Tyr Lys Gln Tyr Asn
            165             170             175

Met Leu Asn Ala Asp Thr Thr Arg Asn Leu Met Ile Cys Phe Leu Trp
        180             185             190

Ile Met Lys Asn Ala Asp Gln Ser Leu Ile Arg Lys Trp Ile Ala Asp
        195             200             205

Leu Pro Ser Thr Gln Leu Asn Arg Ile Leu Asp Leu Leu Phe Ile Cys
    210             215             220

Val Leu Cys Phe Glu Tyr Lys Gly Lys Gln Ser Ser Asp Lys Val Ser
225             230             235             240

Thr Gln Val Leu Gln Lys Ser Arg Asp Val Lys Ala Arg Leu Glu Glu
            245             250             255

Ala Leu Leu Arg Gly Glu Gly Ala Arg Gly Glu Met Met Arg Arg Arg
        260             265             270

Ala Pro Gly Asn Asp Arg Phe Pro Gly Leu Asn Glu Asn Leu Arg Trp
        275             280             285

Lys Lys Glu Gln Thr His Trp Arg Gln Ala Asn Glu Lys Leu Asp Lys
    290             295             300

Thr Lys Ala Glu Leu Asp Gln Glu Ala Leu Ile Ser Gly Asn Leu Ala
305             310             315             320

Thr Glu Ala His Leu Ile Ile Leu Asp Met Gln Glu Asn Ile Ile Gln
            325             330             335
```

```
Thr His Cys Phe Ala Thr Leu Arg Ala Leu Ile Ala Lys Phe Gly Asp
    370                 375             380

Leu Leu Phe Glu Glu Glu Val Glu Gln Cys Phe Asp Leu Cys His Gln
385             390                 395                     400

Val Leu His His Cys Ser Ser Ser Met Asp Val Thr Arg Ser Gln Ala
                405                 410                 415

Cys Ala Thr Leu Tyr Leu Leu Met Arg Phe Ser Phe Gly Ala Thr Ser
            420                 425                 430

Asn Phe Ala Arg Val Lys Met Gln Val Thr Met Ser Leu Ala Ser Leu
            435                 440                 445

Val Gly Arg Ala Pro Asp Phe Asn Glu Glu His Leu Arg Arg Ser Leu
    450                 455                 460

Arg Thr Ile Leu Ala Tyr Ser Glu Glu Asp Thr Ala Met Gln Met Thr
465             470                 475                     480

Pro Phe Pro Thr Gln Val Glu Glu Leu Leu Cys Asn Leu Asn Ser Ile
            485                 490                 495

Leu Tyr Asp Thr Val Lys Met Arg Glu Phe Gln Glu Asp Pro Glu Met
            500                 505                 510

Leu Met Asp Leu Met Tyr Arg Ile Ala Lys Ser Tyr Gln Ala Ser Pro
            515                 520                 525

Asp Leu Arg Leu Thr Trp Leu Gln Asn Met Ala Glu Lys His Thr Lys
    530                 535                 540

Lys Lys Cys Tyr Thr Glu Ala Ala Met Cys Leu Val His Ala Ala Ala
545             550                 555                     560

Leu Val Ala Glu Tyr Leu Ser Met Leu Glu Asp His Ser Tyr Leu Pro
            565                 570                 575

Val Gly Ser Val Ser Phe Gln Asn Ile Ser Ser Asn Val Leu Glu Glu
            580                 585                 590

Ser Val Val Ser Glu Asp Thr Leu Ser Pro Asp Glu Asp Gly Val Cys
            595                 600                 605

Ala Gly Gln Tyr Phe Thr Glu Ser Gly Leu Val Gly Leu Leu Glu Gln
    610                 615                 620

Ala Ala Glu Leu Phe Ser Thr Gly Gly Leu Tyr Glu Thr Val Asn Glu
625             630                 635                     640

Val Tyr Lys Leu Val Ile Pro Ile Leu Glu Ala His Arg Glu Phe Arg
            645                 650                 655
```

Phe Phe Gly Ser Lys Phe Gly Asp Leu Asp Glu Gln Glu Phe Val Tyr
690   695   700

Lys Glu Pro Ala Ile Thr Lys Leu Pro Glu Ile Ser His Arg Leu Glu
705   710   715   720

Ala Phe Tyr Gly Gln Cys Phe Gly Ala Glu Phe Val Glu Val Ile Lys
                    725   730   735

Asp Ser Thr Pro Val Asp Lys Thr Lys Leu Asp Pro Asn Lys Ala Tyr
                740   745   750

Ile Gln Ile Thr Phe Val Glu Pro Tyr Phe Asp Glu Tyr Glu Met Lys
                755   760   765

Asp Arg Val Thr Tyr Phe Glu Lys Asn Phe Asn Leu Arg Arg Phe Met
            770   775   780

Tyr Thr Thr Pro Phe Thr Leu Glu Gly Arg Pro Arg Gly Glu Leu His
785   790   795   800

Glu Gln Tyr Arg Arg Asn Thr Val Leu Thr Thr Met His Ala Phe Pro
                805   810   815

Tyr Ile Lys Thr Arg Ile Ser Val Ile Gln Lys Glu Glu Phe Val Leu
                820   825   830

Thr Pro Ile Glu Val Ala Ile Glu Asp Met Lys Lys Lys Thr Leu Gln
            835   840   845

Leu Ala Val Ala Ile Asn Gln Glu Pro Pro Asp Ala Lys Met Leu Gln
            850   855   860

Met Val Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln Gly Pro Leu
865   870   875   880

Glu Val Ala Gln Val Phe Leu Ala Glu Ile Pro Ala Asp Pro Lys Leu
                885   890   895

Tyr Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Glu Phe Ile Met
            900   905   910

Arg Cys Gly Glu Ala Val Glu Lys Asn Lys Arg Leu Ile Thr Ala Asp
            915   920   925

Gln Arg Glu Tyr Gln Gln Glu Leu Lys Lys Asn Tyr Asn Lys Leu Lys
        930   935   940

Glu Asn Leu Arg Pro Met Ile Glu Arg Lys Ile Pro Glu Leu Tyr Lys
945   950   955   960

Pro Ile Phe Arg Val Glu Ser Gln Lys Arg Asp Ser Phe His Arg Ser
                965   970   975

<210> 5
<211> 31
<212> PRT
<213> Homo sapiens
<223> preliminary human CLASP-5

<400> 5
Glu Lys Pro Ser Ser Phe Val Glu Thr Val Ala Leu Gln Pro Trp Arg
 1   5   10   15
Arg Thr Cys Trp Tyr Leu Lys Asn Gly Thr Phe Ala Thr Gln Asp
            20   25   30

<210> 6
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:furin protease
     consensus cleavage sequence

<400> 6
Arg Lys Gln Arg
 1

<210> 7
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:CLASP-5 homolog
     of furin protease consensus cleavage sequence

<400> 7
Arg Arg Thr Arg
 1

<210> 8
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:CLASP-5
     immunoreceptor tyrosine-based activation
     (ITAM) motif 1

<220>
<221> MOD_RES

<210> 9
<211> 1352
<212> PRT
<213> Homo sapiens

<220>
<223> human CLASP-2A

<400> 9

```
Val Leu His His His Gln Asn Pro Glu Phe Tyr Asp Glu Ile Lys Ile
 1               5                  10                  15

Glu Leu Pro Thr Gln Leu His Glu Lys His His Leu Leu Leu Thr Phe
            20                  25                  30

Phe His Val Ser Cys Asp Asn Ser Ser Lys Gly Ser Thr Lys Lys Arg
        35                  40                  45

Asp Val Val Glu Thr Gln Val Gly Tyr Ser Trp Leu Pro Leu Leu Lys
    50                  55                  60

Asp Gly Arg Val Val Thr Ser Glu Gln His Ile Pro Val Ser Ala Asn
65                  70                  75                  80

Leu Pro Ser Gly Tyr Leu Gly Tyr Gln Glu Leu Gly Met Gly Arg His
            85                  90                  95

Tyr Gly Pro Glu Ile Lys Trp Val Asp Gly Gly Lys Pro Leu Leu Lys
            100                 105                 110

Ile Ser Thr His Leu Val Ser Thr Val Tyr Thr Gln Asp Gln His Leu
        115                 120                 125

His Asn Phe Phe Gln Tyr Cys Gln Lys Thr Glu Ser Gly Ala Gln Ala
    130                 135                 140

Leu Gly Asn Glu Leu Val Lys Tyr Leu Lys Ser Leu His Ala Met Glu
145                 150                 155                 160

Gly His Val Met Ile Ala Phe Leu Pro Thr Ile Leu Asn Gln Leu Phe
            165                 170                 175

Arg Val Leu Thr Arg Ala Thr Gln Glu Glu Val Ala Val Asn Val Thr
            180                 185                 190

Arg Val Ile Ile His Val Val Ala Gln Cys His Glu Glu Gly Leu Glu
            195                 200                 205

Ser His Leu Arg Ser Tyr Val Lys Tyr Ala Tyr Lys Ala Glu Pro Tyr
    210                 215                 220

Val Ala Ser Glu Tyr Lys Thr Val His Glu Glu Leu Thr Lys Ser Met
225                 230                 235                 240
```

```
Gln His Leu Ile Glu Asn Ser Lys Val Lys Leu Leu Arg Asn Gln Arg
        275             280             285

Phe Pro Ala Ser Tyr His His Ala Ala Glu Thr Val Val Asn Met Leu
    290             295             300

Met Pro His Ile Thr Gln Lys Phe Gly Asp Asn Pro Glu Ala Ser Lys
305             310             315             320

Asn Ala Asn His Ser Leu Ala Val Phe Ile Lys Arg Cys Phe Thr Phe
            325             330             335

Met Asp Arg Gly Phe Val Phe Lys Gln Ile Asn Asn Tyr Ile Ser Cys
        340             345             350

Phe Ala Pro Gly Asp Pro Lys Thr Leu Phe Glu Tyr Lys Phe Glu Phe
        355             360             365

Leu Arg Val Val Cys Asn His Glu His Tyr Ile Pro Leu Asn Leu Pro
    370             375             380

Met Pro Phe Gly Lys Gly Arg Ile Gln Arg Tyr Gln Asp Leu Gln Leu
385             390             395             400

Asp Tyr Ser Leu Thr Asp Glu Phe Cys Arg Asn His Phe Leu Val Gly
            405             410             415

Leu Leu Leu Arg Glu Val Gly Thr Ala Leu Gln Glu Phe Arg Glu Val
        420             425             430

Arg Leu Ile Ala Ile Ser Val Leu Lys Asn Leu Leu Ile Lys His Ser
        435             440             445

Phe Asp Asp Arg Tyr Ala Ser Arg Ser His Gln Ala Arg Ile Ala Thr
    450             455             460

Leu Tyr Leu Pro Leu Phe Gly Leu Leu Ile Glu Asn Val Gln Arg Ile
465             470             475             480

Asn Val Arg Asp Val Ser Pro Phe Pro Val Asn Ala Gly Met Thr Val
            485             490             495

Lys Asp Glu Ser Leu Ala Leu Pro Ala Val Asn Pro Leu Val Thr Pro
            500             505             510

Gln Lys Gly Ser Thr Leu Asp Asn Ser Leu His Lys Asp Leu Leu Gly
        515             520             525

Ala Ile Ser Gly Ile Ala Ser Pro Tyr Thr Thr Ser Thr Pro Asn Ile
        530             535             540

Asn Ser Val Arg Asn Ala Asp Ser Arg Gly Ser Leu Ile Ser Thr Asp
545             550             555             560
```

Asp Lys Leu Asp Gln Ser Glu Ile Lys Ser Leu Leu Met Cys Phe Leu
    595   600   605

Tyr Ile Leu Lys Ser Met Ser Asp Asp Ala Leu Phe Thr Tyr Trp Asn
    610   615   620

Lys Ala Ser Thr Ser Glu Leu Met Asp Phe Phe Thr Ile Ser Glu Val
625   630   635   640

Cys Leu His Gln Phe Gln Tyr Met Gly Lys Arg Tyr Ile Ala Arg Asn
            645   650   655

Gln Glu Gly Leu Gly Pro Ile Val His Asp Arg Lys Ser Gln Thr Leu
            660   665   670

Pro Val Ser Arg Asn Arg Thr Gly Met Met His Ala Arg Leu Gln Gln
        675   680   685

Leu Gly Ser Leu Asp Asn Ser Leu Thr Phe Asn His Ser Tyr Gly His
    690   695   700

Ser Asp Ala Asp Val Leu His Gln Ser Leu Leu Glu Ala Asn Ile Ala
705   710   715   720

Thr Glu Val Cys Leu Thr Ala Leu Asp Thr Leu Ser Leu Phe Thr Leu
            725   730   735

Ala Phe Lys Asn Gln Leu Leu Ala Asp His Gly His Asn Pro Leu Met
        740   745   750

Lys Lys Val Phe Asp Val Tyr Leu Cys Phe Leu Gln Lys His Gln Ser
        755   760   765

Glu Thr Ala Leu Lys Asn Val Phe Thr Ala Leu Arg Ser Leu Ile Tyr
    770   775   780

Lys Phe Pro Ser Thr Phe Tyr Glu Gly Arg Ala Asp Met Cys Ala Ala
785   790   795   800

Leu Cys Tyr Glu Ile Leu Lys Cys Cys Asn Ser Lys Leu Ser Ser Ile
            805   810   815

Arg Thr Glu Ala Ser Gln Leu Leu Tyr Phe Leu Met Arg Asn Asn Phe
        820   825   830

Asp Tyr Thr Gly Lys Lys Ser Phe Val Arg Thr His Leu Gln Val Ile
        835   840   845

Ile Ser Val Ser Gln Leu Ile Ala Asp Val Val Gly Ile Gly Glu Thr
    850   855   860

Arg Phe Gln Gln Ser Leu Ser Ile Ile Asn Asn Cys Ala Asn Ser Asp
865   870   875   880

Glu Asn Asp Pro Glu Met Leu Val Asp Leu Gln Tyr Ser Leu Ala Lys
        915   920   925

Ser Tyr Ala Ser Thr Pro Glu Leu Arg Lys Thr Trp Leu Asp Ser Met
    930   935   940

Ala Arg Ile His Val Lys Asn Gly Asp Leu Ser Glu Ala Ala Met Cys
945   950   955   960

Tyr Val His Val Thr Ala Leu Val Ala Glu Tyr Leu Thr Arg Lys Gly
            965   970   975

Val Phe Arg Gln Gly Cys Thr Ala Phe Arg Val Ile Thr Pro Asn Ile
            980   985   990

Asp Glu Glu Ala Ser Met Met Glu Asp Val Gly Met Gln Asp Val His
        995   1000   1005

Phe Asn Glu Asp Val Leu Met Glu Leu Leu Glu Gln Cys Ala Asp Gly
    1010   1015   1020

Leu Trp Lys Ala Glu Arg Tyr Glu Leu Ile Ala Asp Ile Tyr Lys Leu
1025   1030   1035   1040

Ile Ile Pro Ile Tyr Glu Lys Arg Arg Asp Phe Phe Glu Asp Glu Asp
            1045   1050   1055

Gly Lys Glu Tyr Ile Tyr Lys Glu Pro Lys Leu Thr Pro Leu Ser Glu
        1060   1065   1070

Ile Ser Gln Arg Leu Leu Lys Leu Tyr Ser Asp Lys Phe Gly Ser Glu
        1075   1080   1085

Asn Val Lys Met Ile Gln Asp Ser Gly Lys Val Asn Pro Lys Asp Leu
    1090   1095   1100

Asp Ser Lys Tyr Ala Tyr Ile Gln Val Thr His Val Ile Pro Phe Phe
1105   1110   1115   1120

Asp Glu Lys Glu Leu Gln Glu Arg Lys Thr Glu Phe Glu Arg Ser His
            1125   1130   1135

Asn Ile Arg Arg Phe Met Phe Glu Met Pro Phe Thr Gln Thr Gly Lys
        1140   1145   1150

Arg Gln Gly Gly Val Glu Glu Gln Cys Lys Arg Arg Thr Ile Leu Thr
        1155   1160   1165

Ala Ile His Cys Phe Pro Tyr Val Lys Lys Arg Ile Pro Val Met Tyr
    1170   1175   1180

Gln His His Thr Asp Leu Asn Pro Ile Glu Val Ala Ile Asp Glu Met
1185   1190   1195   1200

Val Asn Ala Gly Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asp Asp Thr
     1235   1240   1245

Asn Thr Lys Arg Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val
    1250   1255   1260

Phe Arg Gln Phe Val Glu Ala Cys Gly Gln Ala Leu Ala Val Asn Glu
1265   1270   1275   1280

Arg Leu Ile Lys Glu Asp Gln Leu Glu Tyr Gln Glu Glu Met Lys Ala
           1285   1290   1295

Asn Tyr Arg Glu Met Ala Lys Glu Leu Ser Glu Ile Met His Glu Gln
        1300   1305   1310

Ile Cys Pro Leu Glu Glu Lys Thr Ser Val Leu Pro Asn Ser Leu His
      1315   1320   1325

Ile Phe Asn Ala Ile Ser Gly Thr Pro Thr Ser Thr Met Val His Gly
     1330   1335   1340

Met Thr Ser Ser Ser Ser Val Val
1345   1350

<210> 10
<211> 1534
<212> PRT
<213> Homo sapiens

<220>
<223> human KIAA1058

<400> 10
Ala Ser Gly Asn Leu Asp Lys Asn Ala Arg Phe Ser Ala Ile Tyr Arg
 1   5   10   15

Gln Asp Ser Asn Lys Leu Ser Asn Asp Asp Met Leu Lys Leu Leu Ala
         20   25   30

Asp Phe Arg Lys Pro Glu Lys Met Ala Lys Leu Pro Val Ile Leu Gly
      35   40   45

Asn Leu Asp Ile Thr Ile Asp Asn Val Ser Ser Asp Phe Pro Asn Tyr
    50   55   60

Val Asn Ser Ser Tyr Ile Pro Thr Lys Gln Phe Glu Thr Cys Ser Lys
 65   70   75   80

Thr Pro Ile Thr Phe Glu Val Glu Glu Phe Val Pro Cys Ile Pro Lys
         85   90   95

His Thr Gln Pro Tyr Thr Ile Tyr Thr Asn His Leu Tyr Val Tyr Pro
       100   105   110

```
Pro Leu Lys Cys Ile Tyr Gly Arg Pro Gly Gly Pro Val Phe Thr Arg
145                 150             155                 160

Ser Ala Phe Ala Ala Val Leu His His His Gln Asn Pro Glu Phe Tyr
                165             170                 175

Asp Glu Ile Lys Ile Glu Leu Pro Thr Gln Leu His Glu Lys His His
            180             185                 190

Leu Leu Leu Thr Phe Phe His Val Ser Cys Asp Asn Ser Ser Lys Gly
        195             200             205

Ser Thr Lys Lys Arg Asp Val Val Glu Thr Gln Val Gly Tyr Ser Trp
    210             215                 220

Leu Pro Leu Leu Lys Asp Gly Arg Val Val Thr Ser Glu Gln His Ile
225             230             235                 240

Pro Val Ser Ala Asn Leu Pro Ser Gly Tyr Leu Gly Tyr Gln Glu Leu
            245             250                 255

Gly Met Gly Arg His Tyr Gly Pro Glu Ile Lys Trp Val Asp Gly Gly
            260             265                 270

Lys Pro Leu Leu Lys Ile Ser Thr His Leu Val Ser Thr Val Tyr Thr
        275             280             285

Gln Asp Gln His Leu His Asn Phe Phe Gln Tyr Cys Gln Lys Thr Glu
    290             295             300

Ser Gly Ala Gln Ala Leu Gly Asn Glu Leu Val Lys Tyr Leu Lys Ser
305             310             315                 320

Leu His Ala Met Glu Gly His Val Met Ile Ala Phe Leu Pro Thr Ile
            325             330             335

Leu Asn Gln Leu Phe Arg Val Leu Thr Arg Ala Thr Gln Glu Glu Val
        340             345             350

Ala Val Asn Val Thr Arg Val Ile Ile His Val Val Ala Gln Cys His
        355             360             365

Glu Glu Gly Leu Glu Ser His Leu Arg Ser Tyr Val Lys Tyr Ala Tyr
    370             375             380

Lys Ala Glu Pro Tyr Val Ala Ser Glu Tyr Lys Thr Val His Glu Glu
385             390             395                 400

Leu Thr Lys Ser Met Thr Thr Ile Leu Lys Pro Ser Ala Asp Phe Leu
            405             410             415

Thr Ser Asn Lys Leu Leu Lys Tyr Ser Trp Phe Phe Phe Asp Val Leu
            420             425             430
```

Val Val Asn Met Leu Met Pro His Ile Thr Gln Lys Phe Arg Asp Asn
465   470   475   480

Pro Glu Ala Ser Lys Asn Ala Asn His Ser Leu Ala Val Phe Ile Lys
              485   490   495

Arg Cys Phe Thr Phe Met Asp Arg Gly Phe Val Phe Lys Gln Ile Asn
              500   505   510

Asn Tyr Ile Ser Cys Phe Ala Pro Gly Asp Pro Lys Thr Leu Phe Glu
              515   520   525

Tyr Lys Phe Glu Phe Leu Arg Val Val Cys Asn His Glu His Tyr Ile
              530   535   540

Pro Leu Asn Leu Pro Met Pro Phe Gly Lys Gly Arg Ile Gln Arg Tyr
545   550   555   560

Gln Asp Leu Gln Leu Asp Tyr Ser Leu Thr Asp Glu Phe Cys Arg Asn
              565   570   575

His Phe Leu Val Gly Leu Leu Leu Arg Glu Val Gly Thr Ala Leu Gln
              580   585   590

Glu Phe Arg Glu Val Arg Leu Ile Ala Ile Ser Val Leu Lys Asn Leu
              595   600   605

Leu Ile Lys His Ser Phe Asp Asp Arg Tyr Ala Ser Arg Ser His Gln
              610   615   620

Ala Arg Ile Ala Thr Leu Tyr Leu Pro Leu Phe Gly Leu Leu Ile Glu
625   630   635   640

Asn Val Gln Arg Ile Asn Val Arg Asp Val Ser Pro Phe Pro Val Asn
              645   650   655

Ala Gly Met Thr Val Lys Asp Glu Ser Leu Ala Leu Pro Ala Val Asn
              660   665   670

Pro Leu Val Thr Pro Gln Lys Gly Ser Thr Leu Asp Asn Ser Leu His
              675   680   685

Lys Asp Leu Leu Gly Ala Ile Ser Gly Ile Ala Ser Pro Tyr Thr Thr
              690   695   700

Ser Thr Pro Asn Ile Asn Ser Val Arg Asn Ala Asp Ser Arg Gly Ser
705   710   715   720

Leu Ile Ser Thr Asp Ser Gly Asn Ser Leu Pro Glu Arg Asn Ser Glu
              725   730   735

Lys Ser Asn Ser Leu Asp Lys His Gln Gln Ser Ser Thr Leu Gly Asn
              740   745   750

Phe Thr Tyr Trp Asn Lys Ala Ser Thr Ser Glu Leu Met Asp Phe Phe
785   790   795   800

Thr Ile Ser Glu Val Cys Leu His Gln Phe Gln Tyr Met Gly Lys Arg
              805   810   815

Tyr Ile Ala Arg Thr Gly Met Met His Ala Arg Leu Gln Gln Leu Gly
              820   825   830

Ser Leu Asp Asn Ser Leu Thr Phe Asn His Ser Tyr Gly His Ser Asp
              835   840   845

Ala Asp Val Leu His Gln Ser Leu Leu Glu Ala Asn Ile Ala Thr Glu
          850   855   860

Val Cys Leu Thr Ala Leu Asp Thr Leu Ser Leu Phe Thr Leu Ala Phe
865   870   875   880

Lys Asn Gln Leu Leu Ala Asp His Gly His Asn Pro Leu Met Lys Lys
              885   890   895

Val Phe Asp Val Tyr Leu Cys Phe Leu Gln Lys His Gln Ser Glu Thr
              900   905   910

Ala Leu Lys Asn Val Phe Thr Ala Leu Arg Ser Leu Ile Tyr Lys Phe
              915   920   925

Pro Ser Thr Phe Tyr Glu Gly Arg Ala Asp Met Cys Ala Ala Leu Cys
          930   935   940

Tyr Glu Ile Leu Lys Cys Cys Asn Ser Lys Leu Ser Ser Ile Arg Thr
945   950   955   960

Glu Ala Ser Gln Leu Leu Tyr Phe Leu Met Arg Asn Asn Phe Asp Tyr
              965   970   975

Thr Gly Lys Lys Ser Phe Val Arg Thr His Leu Gln Val Ile Ile Ser
              980   985   990

Val Ser Gln Leu Ile Ala Asp Val Val Gly Ile Gly Gly Thr Arg Phe
          995   1000   1005

Gln Gln Ser Leu Ser Ile Ile Asn Asn Cys Ala Asn Ser Asp Arg Leu
    1010   1015   1020

Ile Lys His Thr Ser Phe Ser Ser Asp Val Lys Asp Leu Thr Lys Arg
1025   1030   1035   1040

Ile Arg Thr Val Leu Met Ala Thr Ala Gln Met Lys Glu His Glu Asn
              1045   1050   1055

Asp Pro Glu Met Leu Val Asp Leu Gln Tyr Ser Leu Ala Lys Ser Tyr
          1060   1065   1070

His Val Thr Ala Leu Val Ala Glu Tyr Leu Thr Arg Lys Glu Ala Val
1105   1110   1115   1120

Gln Trp Glu Pro Pro Leu Leu Pro His Ser His Ser Ala Cys Leu Arg
                1125   1130   1135

Arg Ser Arg Gly Gly Val Phe Arg Gln Gly Cys Thr Ala Phe Arg Val
                1140   1145   1150

Ile Thr Pro Asn Ile Asp Glu Glu Ala Ser Met Met Glu Asp Val Gly
                1155   1160   1165

Met Gln Asp Val His Phe Asn Glu Asp Val Leu Met Glu Leu Leu Glu
                1170   1175   1180

Gln Cys Ala Asp Gly Leu Trp Lys Ala Glu Arg Tyr Glu Leu Ile Ala
1185   1190   1195   1200

Asp Ile Tyr Lys Leu Ile Ile Pro Ile Tyr Glu Lys Arg Arg Asp Phe
                1205   1210   1215

Glu Arg Leu Ala His Leu Tyr Asp Thr Leu His Arg Ala Tyr Ser Lys
                1220   1225   1230

Val Thr Glu Val Met His Ser Gly Arg Arg Leu Leu Gly Thr Tyr Phe
                1235   1240   1245

Arg Val Ala Phe Phe Gly Gln Ala Ala Gln Tyr Gln Phe Thr Asp Ser
                1250   1255   1260

Glu Thr Asp Val Glu Gly Phe Phe Glu Asp Glu Asp Gly Lys Glu Tyr
1265   1270   1275   1280

Ile Tyr Lys Glu Pro Lys Leu Thr Pro Leu Ser Glu Ile Ser Gln Arg
                1285   1290   1295

Leu Leu Lys Leu Tyr Ser Asp Lys Phe Gly Ser Glu Asn Val Lys Met
                1300   1305   1310

Ile Gln Asp Ser Gly Lys Val Asn Pro Lys Asp Leu Asp Ser Lys Tyr
                1315   1320   1325

Ala Tyr Ile Gln Val Thr His Val Ile Pro Phe Phe Asp Glu Lys Glu
                1330   1335   1340

Leu Gln Glu Arg Lys Thr Glu Phe Glu Arg Ser His Asn Ile Arg Arg
1345   1350   1355   1360

Phe Met Phe Glu Met Pro Phe Thr Gln Thr Gly Lys Arg Gln Gly Gly
                1365   1370   1375

Val Glu Glu Gln Cys Lys Arg Arg Thr Ile Leu Thr Ala Ile His Cys
                1380   1385   1390

Ala Glu Leu Arg Gln Leu Cys Ser Ser Ala Glu Val Asp Met Ile Lys
1425   1430   1435   1440

Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Gln Val Asn Ala Gly
                1445   1450   1455

Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asp Asp Thr Asn Thr Lys Arg
                1460   1465   1470

Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val Phe Arg Gln Phe
                1475   1480   1485

Val Glu Ala Cys Gly Gln Ala Leu Ala Val Asn Glu Arg Leu Ile Lys
                1490   1495   1500

Glu Asp Gln Leu Glu Tyr Gln Glu Glu Met Lys Ala Asn Tyr Arg Glu
1505   1510   1515   1520

Met Ala Lys Glu Leu Ser Glu Ile Met His Glu Gln Leu Gly
                1525   1530

<210> 11
<211> 738
<212> PRT
<213> Rattus norvegicus

<220>
<223> rat TRG

<400> 11
Lys Leu Ser Arg Gly His Ser Pro Leu Met Lys Lys Val Phe Asp Val
  1   5   10   15

Tyr Leu Cys Phe Leu Gln Lys His Gln Ser Glu Met Ala Leu Lys Asn
                20   25   30

Val Phe Thr Ala Leu Arg Ser Leu Ile Tyr Lys Phe Pro Ser Thr Phe
                35   40   45

Tyr Glu Gly Arg Ala Asp Met Cys Ala Ser Leu Cys Tyr Glu Val Leu
        50   55   60

Lys Cys Cys Asn Ser Lys Leu Ser Ser Ile Arg Thr Glu Ala Ser Gln
 65   70   75   80

Leu Leu Tyr Phe Leu Met Arg Asn Asn Phe Asp Tyr Thr Gly Lys Lys
                85   90   95

Ser Phe Val Arg Thr His Leu Gln Val Ile Ile Ser Leu Ser Gln Leu
                100   105   110

Ile Ala Asp Val Val Gly Ile Gly Gly Thr Arg Phe Gln Gln Ser Leu
                115   120   125

```
Leu Met Ala Thr Ala Gln Met Lys Glu His Glu Asn Asp Pro Glu Met
             165         170             175

Leu Val Asp Leu Gln Tyr Ser Leu Ala Lys Ser Tyr Ala Ser Thr Pro
             180             185             190

Glu Leu Arg Lys Thr Trp Leu Asp Ser Met Ala Arg Ile His Val Lys
         195             200             205

Asn Gly Asp Leu Ser Glu Ala Ala Met Cys Tyr Val His Val Thr Ala
         210             215             220

Leu Val Ala Glu Tyr Leu Thr Arg Lys Glu Ala Asp Leu Ala Leu Gln
225             230             235             240

Arg Glu Pro Pro Val Phe Pro Tyr Ser His Thr Ser Cys Gln Arg Lys
             245             250             255

Ser Arg Gly Gly Met Phe Arg Gln Gly Cys Thr Ala Phe Arg Val Ile
             260             265             270

Thr Pro Asn Ile Asp Glu Glu Ala Ser Met Met Glu Asp Val Gly Met
             275             280             285

Gln Asp Val His Phe Asn Glu Asp Val Leu Met Glu Leu Leu Glu Gln
290             295             300

Cys Ala Asp Gly Leu Trp Lys Ala Glu Arg Leu Arg Ala Gly Leu Leu
305             310             315             320

Thr Ser Ile Asn Ser Ser Ser Pro Ser Met Lys Ser Gly Gly Thr Leu
             325             330             335

Glu Thr Thr His Leu Tyr Asp Thr Leu His Arg Pro Tyr Ser Lys Val
             340             345             350

Thr Glu Val Ile Thr Arg Ala Ala Gly Ser Trp Asp Leu Leu Pro Gly
             355             360             365

Gly Leu Phe Gly Gln Gly Phe Phe Glu Asp Glu Asp Gly Lys Glu Tyr
         370             375             380

Ile Tyr Lys Glu Pro Lys Leu Thr Pro Leu Ser Glu Ile Ser Gln Arg
385             390             395             400

Leu Leu Lys Leu Tyr Ser Asp Lys Phe Gly Ser Glu Asn Val Lys Met
             405             410             415

Ile Gln Asp Ser Gly Lys Val Asn Pro Lys Asp Leu Asp Ser Lys Phe
             420             425             430

Ala Tyr Ile Gln Val Thr His Val Thr Pro Phe Phe Asp Glu Lys Glu
             435             440             445
```

Val Glu Glu Gln Cys Lys Arg Arg Thr Ile Leu Thr Ala Ile His Cys
                485   490   495

Phe Pro Tyr Val Lys Lys Arg Ile Pro Val Met Tyr Gln His His Thr
            500   505   510

Asp Leu Asn Pro Ile Glu Val Ala Ile Asp Glu Met Ser Lys Lys Val
            515   520   525

Ala Glu Leu His Gln Leu Cys Ser Ser Ala Glu Val Asp Met Ile Lys
        530   535   540

Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Gln Val Asn Ala Gly
545   550   555   560

Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asp Asp Thr Asn Thr Lys Arg
            565   570   575

Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val Phe Arg Gln Phe
            580   585   590

Val Glu Ala Cys Gly Gln Ala Leu Ala Val Asn Glu Arg Leu Ile Lys
        595   600   605

Glu Asp Gln Leu Glu Tyr Gln Glu Glu Met Lys Ala Asn Tyr Arg Glu
        610   615   620

Ile Arg Lys Glu Leu Ser Asp Ile Ile Val Pro Arg Ile Cys Pro Gly
625   630   635   640

Glu Asp Lys Arg Ala Thr Lys Phe Pro Ala His Leu Gln Arg His Gln
            645   650   655

Arg Asp Thr Asn Lys His Ser Gly Ser Arg Val Asp Gln Phe Ile Leu
            660   665   670

Ser Cys Val Thr Leu Pro His Glu Pro His Val Gly Thr Cys Phe Val
        675   680   685

Met Cys Lys Leu Arg Thr Thr Phe Arg Ala Asn His Trp Phe Cys Gln
        690   695   700

Ala Gln Glu Glu Ala Met Gly Asn Gly Arg Glu Lys Glu Pro Trp Thr
705   710   715   720

Val Ile Phe Asn Ser Arg Phe Tyr Arg Ser Trp Gly Lys Val His Ile
            725   730   735

Phe Phe

<210> 12
<211> 1214
<212> PRT

<400> 12

```
Met Glu Ile Gln Val Leu Ile Arg Phe Leu Ser Val Ile Leu Met Gln
  1               5                  10                  15

Leu Phe Trp Val Leu Pro Asn Met Ile His Glu Asp Asp Val Pro Ile
             20                  25                  30

Ser Cys Pro Met Val Leu Phe His Ile Val Ser Lys Cys His Glu Glu
             35                  40                  45

Gly Leu Asp Ser Tyr Leu Ser Ser Phe Ile Lys Tyr Ser Phe Arg Pro
         50                  55                  60

Gly Lys Pro Ser Ala Pro Gln Ala Pro Leu Ile His Glu Thr Leu Ala
 65                  70                  75                  80

Thr Met Met Ile Ala Leu Leu Lys Gln Ser Ala Asp Phe Leu Ala Ile
                 85                  90                  95

Asn Lys Leu Leu Lys Tyr Ser Trp Phe Phe Phe Glu Ile Ile Ala Lys
             100                 105                 110

Ser Met Ala Thr Tyr Leu Leu Glu Glu Asn Lys Ile Lys Leu Thr His
             115                 120                 125

Gly Gln Arg Phe Pro Lys Ala Tyr His His Ala Leu His Ser Leu Phe
             130                 135                 140

Leu Ala Ile Thr Ile Val Glu Ser Gln Tyr Ala Glu Ile Pro Lys Glu
145                 150                 155                 160

Ser Arg Asn Val Asn Tyr Ser Leu Ala Ser Phe Leu Lys Cys Cys Leu
                 165                 170                 175

Thr Leu Met Asp Arg Gly Phe Val Phe Asn Leu Ile Asn Asp Tyr Ile
             180                 185                 190

Ser Gly Phe Ser Pro Lys Asp Pro Lys Val Leu Ala Glu Tyr Lys Phe
             195                 200                 205

Glu Phe Leu Gln Thr Ile Cys Asn His Glu His Tyr Ile Pro Leu Asn
             210                 215                 220

Leu Pro Met Ala Phe Ala Lys Pro Lys Leu Gln Arg Val Gln Asp Ser
225                 230                 235                 240

Asn Leu Glu Tyr Ser Leu Ser Asp Glu Tyr Cys Lys His His Phe Leu
                 245                 250                 255

Val Gly Leu Leu Leu Arg Glu Thr Ser Ile Ala Leu Gln Asp Asn Tyr
             260                 265                 270

Glu Ile Arg Tyr Thr Ala Ile Ser Val Ile Lys Asn Leu Leu Ile Lys
             275                 280                 285
```

Arg Leu Ala Gly Arg Asp Thr Leu Tyr Ser Cys Ala Ala Met Pro Asn
              325   330   335

Ser Ala Ser Arg Asp Glu Phe Pro Cys Gly Phe Thr Ser Pro Ala Asn
              340   345   350

Arg Gly Ser Leu Ser Thr Asp Lys Asp Thr Ala Tyr Gly Ser Phe Gln
              355   360   365

Asn Gly His Gly Ile Lys Arg Glu Asp Ser Arg Gly Ser Leu Ile Pro
      370   375   380

Glu Gly Ala Thr Gly Phe Pro Asp Gln Gly Asn Thr Gly Glu Asn Thr
385   390   395   400

Arg Gln Ser Ser Thr Arg Ser Ser Val Ser Gln Tyr Asn Arg Leu Asp
              405   410   415

Gln Tyr Glu Ile Arg Ser Leu Leu Met Cys Tyr Leu Tyr Ile Val Lys
              420   425   430

Met Ile Ser Glu Asp Thr Leu Leu Thr Tyr Trp Asn Lys Val Ser Pro
              435   440   445

Gln Glu Leu Ile Asn Ile Leu Ile Leu Leu Glu Val Cys Leu Phe His
      450   455   460

Phe Arg Tyr Met Gly Lys Arg Asn Ile Ala Arg Val His Asp Ala Trp
465   470   475   480

Leu Ser Lys His Phe Gly Ile Asp Arg Lys Ser Gln Thr Met Pro Ala
              485   490   495

Leu Arg Asn Arg Ser Gly Val Met Gln Ala Arg Leu Gln His Leu Ser
              500   505   510

Ser Leu Glu Ser Ser Phe Thr Leu Asn His Ser Ser Thr Thr Thr Glu
              515   520   525

Ala Asp Ile Phe His Gln Ala Leu Leu Glu Gly Asn Thr Ala Thr Glu
      530   535   540

Val Ser Leu Thr Val Leu Asp Thr Ile Ser Phe Phe Thr Gln Cys Phe
545   550   555   560

Lys Thr His Phe Leu Asn Asn Asp Gly His Asn Pro Leu Met Lys Lys
              565   570   575

Val Phe Asp Ile His Leu Ala Phe Leu Lys Asn Gly Gln Ser Glu Val
              580   585   590

Ser Leu Lys His Val Phe Ala Ser Leu Arg Ala Phe Ile Ser Lys Phe
              595   600   605

```
Glu Ala Ser Ala Leu Leu Tyr Leu Leu Met Arg Asn Asn Phe Glu Tyr
            645             650                 655

Thr Lys Arg Lys Thr Phe Leu Arg Thr His Leu Gln Ile Ile Ile Ala
            660             665                 670

Val Ser Gln Leu Ile Ala Asp Val Ala Leu Ser Gly Gly Ser Arg Phe
            675             680                 685

Gln Glu Ser Leu Phe Ile Ile Asn Asn Phe Ala Asn Ser Asp Arg Pro
            690             695                 700

Met Leu Ala Arg Ala Phe Pro Ala Glu Val Lys Asp Leu Thr Lys Arg
705                 710                 715                 720

Ile Arg Thr Val Leu Met Ala Thr Ala Gln Met Lys Glu His Glu Lys
            725             730                 735

Asp Pro Glu Met Leu Ile Asp Leu Gln Tyr Ser Leu Ala Lys Ser Tyr
            740             745                 750

Ala Ser Thr Pro Glu Leu Arg Lys Thr Trp Leu Asp Ser Met Ala Lys
            755             760                 765

Ile His Val Lys Asn Gly Asp Phe Ser Glu Ala Ala Met Cys Tyr Val
            770             775                 780

His Val Ala Ala Leu Val Ala Glu Phe Leu His Arg Lys Lys Leu Phe
785                 790                 795                 800

Pro Asn Gly Cys Ser Ala Phe Lys Lys Ile Thr Pro Asn Ile Asp Glu
            805             810                 815

Glu Gly Ala Met Lys Glu Asp Ala Gly Met Met Asp Val His Tyr Ser
            820             825                 830

Glu Glu Val Leu Leu Glu Leu Leu Glu Gln Cys Val Asn Gly Leu Trp
            835             840                 845

Lys Ala Glu Arg Tyr Glu Ile Ile Ser Glu Ile Ser Lys Leu Ile Gly
    850             855                 860

Pro Ile Tyr Glu Asn Arg Arg Glu Phe Glu Asn Leu Thr Gln Val Tyr
865             870                 875                 880

Arg Thr Leu His Gly Ala Tyr Thr Lys Ile Leu Glu Val Met His Thr
            885             890                 895

Lys Lys Arg Leu Leu Gly Thr Phe Phe Arg Val Ala Phe Tyr Gly Gln
            900             905                 910

Ser Phe Phe Glu Glu Glu Asp Gly Lys Glu Tyr Ile Tyr Lys Glu Pro
    915             920                 925
```

```
Lys Val Asn Ala Lys Glu Leu Asp Pro Lys Tyr Ala His Ile Gln Val
              965                 970                 975

Thr Tyr Val Lys Pro Tyr Phe Asp Asp Lys Glu Leu Thr Glu Arg Lys
              980                 985                 990

Thr Glu Phe Glu Arg Asn His Asn Ile Ser Arg Phe Val Phe Glu Ala
              995                1000                1005

Pro Tyr Thr Leu Ser Gly Lys Lys Gln Gly Cys Ile Glu Glu Gln Cys
          1010                1015                1020

Lys Arg Arg Thr Ile Leu Thr Thr Ser Asn Ser Phe Pro Tyr Val Lys
1025                1030                1035                1040

Lys Arg Ile Pro Ile Asn Cys Glu Gln Gln Ile Asn Leu Lys Pro Ile
              1045                1050                1055

Asp Gly Ala Thr Asp Glu Ile Lys Asp Lys Thr Ala Glu Leu Gln Lys
              1060                1065                1070

Leu Cys Ser Ser Thr Asp Val Asp Met Ile Gln Leu Gln Leu Lys Leu
              1075                1080                1085

Gln Gly Trp Val Ser Val Gln Val Asn Ala Gly Pro Leu Ala Tyr Ala
          1090                1095                1100

Arg Ala Phe Leu Asn Asp Ser Gln Ala Ser Lys Tyr Pro Pro Lys Lys
1105                1110                1115                1120

Val Ser Glu Leu Lys Asp Met Phe Arg Lys Phe Ile Gln Ala Cys Ser
              1125                1130                1135

Ile Ala Leu Glu Leu Asn Glu Arg Leu Ile Lys Glu Asp Gln Val Glu
              1140                1145                1150

Tyr His Glu Gly Leu Lys Ser Asn Phe Arg Asp Met Val Lys Glu Leu
          1155                1160                1165

Ser Asp Ile Ile His Glu Gln Ile Leu Gln Glu Asp Thr Met His Ser
          1170                1175                1180

Pro Trp Met Ser Asn Thr Leu His Val Phe Cys Ala Ile Ser Gly Thr
1185                1190                1195                1200

Ser Ser Asp Arg Gly Tyr Gly Ser Pro Arg Tyr Ala Glu Val
              1205                1210
```

<210> 13
<211> 1288
<212> PRT
<213> Homo sapiens

```
Gln Asn Glu Glu Asp Glu Ile Thr Thr Thr Val Thr Arg Val Leu Pro
          20              25              30

Asp Ile Val Ala Lys Cys His Glu Glu Gln Leu Asp His Ser Val Gln
          35              40              45

Ser Tyr Ile Lys Phe Val Phe Lys Thr Arg Ala Cys Lys Glu Arg Pro
          50              55              60

Val His Glu Asp Leu Ala Lys Asn Val Thr Gly Leu Leu Lys Ser Asn
65                  70              75                  80

Asp Ser Pro Thr Val Lys His Val Leu Lys His Ser Trp Phe Phe Phe
                85              90                  95

Ala Ile Ile Leu Lys Ser Met Ala Gln His Leu Ile Asp Thr Asn Lys
              100             105             110

Ile Gln Leu Pro Arg Pro Gln Arg Phe Pro Glu Ser Tyr Gln Asn Glu
          115             120             125

Leu Asp Asn Leu Val Met Val Leu Ser Asp His Val Ile Trp Lys Tyr
          130             135             140

Lys Asp Ala Leu Glu Glu Thr Arg Arg Ala Thr His Ser Val Ala Arg
145             150             155             160

Phe Leu Lys Arg Cys Phe Thr Phe Met Asp Arg Gly Cys Val Phe Lys
              165             170             175

Met Val Asn Asn Tyr Ile Ser Met Phe Ser Ser Gly Asp Leu Lys Thr
          180             185             190

Leu Cys Gln Tyr Lys Phe Asp Phe Leu Gln Glu Val Cys Gln His Glu
          195             200             205

His Phe Ile Pro Leu Cys Leu Pro Ile Arg Ser Ala Asn Ile Pro Asp
210             215             220

Pro Leu Thr Pro Ser Glu Ser Thr Gln Glu Leu His Ala Ser Asp Met
225             230             235             240

Pro Glu Tyr Ser Val Thr Asn Glu Phe Cys Arg Lys His Phe Leu Ile
              245             250             255

Gly Ile Leu Leu Arg Glu Val Gly Phe Ala Leu Gln Glu Asp Gln Asp
          260             265             270

Val Arg His Leu Ala Leu Ala Val Leu Lys Asn Leu Met Ala Lys His
          275             280             285

Ser Phe Asp Asp Arg Tyr Arg Glu Pro Arg Lys Gln Ala Gln Ile Ala
          290             295             300
```

Gly Ser Arg Asp Asp Leu Ser Thr Asn Gly Gly Phe Gln Ser Gln Thr
        340   345   350

Ala Ile Lys His Ala Asn Ser Val Asp Thr Ser Phe Ser Lys Asp Val
        355   360   365

Leu Asn Ser Ile Ala Ala Phe Ser Ser Ile Ala Ile Ser Thr Val Asn
    370   375   380

His Ala Asp Ser Arg Ala Ser Leu Ala Ser Leu Asp Ser Asn Pro Ser
385   390   395   400

Thr Asn Glu Lys Ser Ser Glu Lys Thr Asp Asn Cys Glu Lys Ile Pro
            405   410   415

Arg Pro Leu Ala Leu Ile Gly Ser Thr Leu Arg Phe Asp Arg Leu Asp
        420   425   430

Gln Ala Glu Thr Arg Ser Leu Leu Met Cys Phe Leu His Ile Met Lys
        435   440   445

Thr Ile Ser Tyr Glu Thr Leu Ile Ala Tyr Trp Gln Arg Ala Pro Ser
    450   455   460

Pro Glu Val Ser Asp Phe Phe Ser Ile Leu Asp Val Cys Leu Gln Asn
465   470   475   480

Phe Arg Tyr Leu Gly Lys Arg Asn Ile Ile Arg Lys Ile Ala Ala Ala
            485   490   495

Phe Lys Phe Val Gln Ser Thr Gln Asn Asn Gly Thr Leu Lys Gly Ser
            500   505   510

Asn Pro Ser Cys Gln Thr Ser Gly Leu Leu Ala Gln Trp Met His Ser
            515   520   525

Thr Ser Arg His Glu Gly His Lys Gln His Arg Ser Gln Thr Leu Pro
    530   535   540

Ile Ile Arg Gly Lys Asn Ala Leu Ser Asn Pro Lys Leu Leu Gln Met
545   550   555   560

Leu Asp Asn Thr Met Thr Ser Asn Ser Asn Glu Ile Asp Ile Val His
            565   570   575

His Val Asp Thr Glu Ala Asn Ile Ala Thr Glu Gly Cys Leu Thr Ile
            580   585   590

Leu Asp Leu Val Ser Leu Phe Thr Gln Thr His Gln Arg Gln Leu Gln
    595   600   605

Gln Cys Asp Cys Gln Asn Ser Leu Met Lys Arg Gly Phe Asp Thr Tyr
    610   615   620

```
Gln Gly Pro Ala Asp Leu Cys Gly Ser Phe Cys Tyr Glu Val Leu Lys
        660                 665                 670

Cys Cys Asn His Arg Ser Arg Ser Thr Gln Thr Glu Ala Ser Ala Leu
        675                 680                 685

Leu Tyr Leu Phe Met Arg Lys Asn Phe Glu Phe Asn Lys Gln Lys Ser
    690                 695                 700

Ile Val Arg Ser His Leu Gln Leu Ile Lys Ala Val Ser Gln Leu Ile
705                 710                 715                 720

Ala Asp Ala Gly Ile Gly Gly Ser Arg Phe Gln His Ser Leu Ala Ile
                725                 730                 735

Thr Asn Asn Phe Ala Asn Gly Asp Lys Gln Met Lys Asn Ser Asn Phe
            740                 745                 750

Pro Ala Glu Val Lys Asp Leu Thr Lys Arg Ile Arg Thr Val Leu Met
        755                 760                 765

Ala Thr Ala Gln Met Lys Glu His Glu Lys Asp Pro Glu Met Leu Val
        770                 775                 780

Asp Leu Gln Tyr Ser Leu Ala Asn Ser Tyr Ala Ser Thr Pro Glu Leu
785                 790                 795                 800

Arg Arg Thr Trp Leu Glu Ser Met Ala Lys Ile His Ala Arg Asn Gly
                805                 810                 815

Asp Leu Ser Glu Ala Ala Met Cys Tyr Ile His Ile Ala Ala Leu Ile
            820                 825                 830

Ala Glu Tyr Leu Lys Arg Lys Gly Tyr Trp Lys Val Glu Lys Ile Cys
        835                 840                 845

Thr Ala Ser Leu Leu Ser Glu Asp Thr His Pro Cys Asp Ser Asn Ser
    850                 855                 860

Leu Leu Thr Thr Pro Ser Gly Gly Ser Met Phe Ser Met Gly Trp Pro
865                 870                 875                 880

Ala Phe Leu Ser Ile Thr Pro Asn Ile Lys Glu Glu Gly Ala Ala Lys
                885                 890                 895

Glu Asp Ser Gly Met His Asp Thr Pro Tyr Asn Glu Asn Ile Leu Val
            900                 905                 910

Glu Gln Leu Tyr Met Cys Gly Glu Phe Leu Trp Lys Ser Glu Arg Tyr
        915                 920                 925

Glu Leu Ile Ala Asp Val Asn Lys Pro Ile Ile Ala Val Phe Glu Lys
        930                 935                 940
```

```
Gly Arg Tyr Tyr Arg Val Ala Phe Tyr Gly Gln Gly Phe Phe Glu Glu
    980                         985                   990

Glu Glu Gly Lys Glu Tyr Ile Tyr Lys Glu Pro Lys Leu Thr Gly Leu
    995                     1000                1005

Ser Glu Ile Ser Gln Arg Leu Leu Lys Leu Tyr Ala Asp Lys Phe Gly
   1010                1015                1020

Ala Asp Asn Val Lys Ile Ile Gln Asp Ser Asn Lys Val Asn Pro Lys
1025                1030                1035                1040

Asp Leu Asp Pro Lys Tyr Ala Tyr Ile Gln Val Thr Tyr Val Thr Pro
                1045                1050                1055

Phe Phe Glu Glu Lys Glu Ile Glu Asp Arg Lys Thr Asp Phe Glu Met
            1060                1065                1070

His His Asn Ile Asn Arg Phe Val Phe Glu Thr Pro Phe Thr Leu Ser
            1075                1080                1085

Gly Lys Lys His Gly Gly Val Ala Glu Gln Cys Lys Arg Arg Thr Ile
    1090                1095                1100

Leu Thr Thr Ser His Leu Phe Pro Tyr Val Lys Lys Arg Ile Gln Val
1105                1110                1115                1120

Ile Ser Gln Ser Ser Thr Glu Leu Asn Pro Ile Glu Val Ala Ile Asp
                1125                1130                1135

Glu Met Ser Arg Lys Val Ser Glu Leu Asn Gln Leu Cys Thr Met Glu
            1140                1145                1150

Glu Val Asp Met Ile Ser Leu Gln Leu Lys Leu Gln Gly Ser Val Ser
            1155                1160                1165

Val Lys Val Asn Ala Gly Pro Met Ala Tyr Ala Arg Ala Phe Leu Glu
    1170                1175                1180

Glu Thr Asn Ala Lys Lys Tyr Pro Asp Asn Gln Val Lys Leu Leu Lys
1185                1190                1195                1200

Glu Ile Phe Arg Gln Phe Ala Asp Ala Cys Gly Gln Ala Leu Asp Val
            1205                1210                1215

Asn Glu Arg Leu Ile Lys Glu Asp Gln Leu Glu Tyr Gln Glu Glu Leu
            1220                1225                1230

Arg Ser His Tyr Lys Asp Met Leu Ser Glu Leu Ser Thr Val Met Asn
    1235                1240                1245

Glu Gln Ile Thr Gly Arg Asp Asp Leu Ser Lys Arg Gly Val Asp Gln
    1250                1255                1260
```

<210> 14
<211> 1220
<212> PRT
<213> Homo sapiens

<220>
<223> human CLASP-3

<400> 14

```
Gly Pro Gly Pro Ala Arg Ser Thr Val Ser Ile Ser Leu Ile Ser Asn
 1               5                  10                  15

Ser Ala Arg Val Asn Arg Ser Arg Ser Leu Ser Asn Ser Asn Pro Asp
            20                  25                  30

Ile Ser Gly Thr Pro Thr Ser Pro Asp Asp Glu Val Arg Ser Ile Ile
            35                  40                  45

Gly Ser Lys Gly Leu Asp Arg Ser Asn Ser Trp Val Asn Thr Gly Gly
        50                  55                  60

Pro Lys Ala Ala Pro Trp Gly Ser Asn Pro Ser Pro Ser Ala Glu Ser
65                  70                  75                  80

Thr Gln Ala Met Asp Arg Ser Cys Asn Arg Met Ser Ser His Thr Glu
                85                  90                  95

Thr Ser Ser Phe Leu Gln Thr Leu Thr Gly Arg Leu Pro Thr Lys Lys
                100                 105                 110

Leu Phe His Glu Glu Leu Ala Leu Gln Trp Val Val Cys Ser Gly Ser
                115                 120                 125

Val Arg Glu Ser Ala Leu Gln Gln Ala Trp Phe Phe Phe Glu Leu Met
        130                 135                 140

Val Lys Ser Met Val His His Leu Tyr Phe Asn Asp Lys Leu Glu Ala
145                 150                 155                 160

Pro Arg Lys Ser Arg Phe Pro Glu Arg Phe Met Asp Asp Ile Ala Ala
                165                 170                 175

Leu Val Ser Thr Ile Ala Ser Asp Ile Val Ser Arg Phe Gln Lys Asp
            180                 185                 190

Thr Glu Met Val Glu Arg Leu Asn Thr Ser Leu Ala Phe Phe Leu Asn
        195                 200                 205

Asp Leu Leu Ser Val Met Asp Arg Gly Phe Val Phe Ser Leu Ile Lys
    210                 215                 220

Ser Cys Tyr Lys Gln Val Ser Ser Lys Leu Tyr Ser Leu Pro Asn Pro
225                 230                 235                 240
```

Pro Ala Ser Pro Ser Pro Ser Val Ser Ser Ala Thr Ser Gln Ser Ser
275 280 285

Gly Phe Ser Thr Asn Val Gln Asp Gln Lys Ile Ala Asn Met Phe Glu
290 295 300

Leu Ser Val Pro Phe Arg Gln Gln His Tyr Leu Ala Gly Leu Val Leu
305 310 315 320

Thr Glu Leu Ala Val Ile Leu Asp Pro Asp Ala Glu Gly Leu Phe Gly
325 330 335

Leu His Lys Lys Val Ile Asn Met Val His Asn Leu Leu Ser Ser His
340 345 350

Asp Ser Asp Pro Arg Tyr Ser Asp Pro Gln Ile Lys Ala Arg Val Ala
355 360 365

Met Leu Tyr Leu Pro Leu Ile Gly Ile Ile Met Glu Thr Val Pro Gln
370 375 380

Leu Tyr Asp Phe Thr Glu Thr His Asn Gln Arg Gly Arg Pro Ile Cys
385 390 395 400

Ile Ala Thr Asp Asp Tyr Glu Ser Glu Ser Gly Ser Met Ile Ser Gln
405 410 415

Thr Val Ala Met Ala Ile Ala Gly Thr Ser Val Pro Gln Leu Thr Arg
420 425 430

Pro Gly Ser Phe Leu Leu Thr Ser Thr Ser Gly Arg Gln His Thr Thr
435 440 445

Phe Ser Ala Glu Ser Ser Arg Ser Leu Leu Ile Cys Leu Leu Trp Val
450 455 460

Leu Lys Asn Ala Asp Glu Thr Val Leu Gln Lys Trp Phe Thr Asp Leu
465 470 475 480

Ser Val Leu Gln Leu Asn Arg Leu Leu Asp Leu Leu Tyr Leu Cys Val
485 490 495

Ser Cys Phe Glu Tyr Lys Gly Lys Lys Val Phe Glu Arg Met Asn Ser
500 505 510

Leu Thr Phe Lys Lys Ser Lys Asp Met Arg Ala Lys Leu Glu Glu Ala
515 520 525

Ile Leu Gly Ser Ile Gly Ala Arg Gln Glu Met Val Arg Arg Ser Arg
530 535 540

Gly Gln Leu Glu Arg Ser Pro Ser Gly Ser Ala Phe Gly Ser Gln Glu
545 550 555 560

```
Gly Asn Leu Ala Thr Glu Ala Asn Leu Ile Ile Leu Asp Thr Leu Glu
        595                 600                 605

Ile Val Val Gln Thr Val Ser Val Thr Glu Ser Lys Glu Ser Ile Leu
    610             615                 620

Gly Gly Val Leu Lys Val Leu Leu His Ser Met Ala Cys Asn Gln Ser
625                 630                 635                 640

Ala Val Tyr Leu Gln His Cys Phe Ala Thr Gln Arg Ala Leu Val Ser
            645                 650                 655

Lys Phe Pro Glu Leu Leu Phe Glu Glu Glu Thr Glu Gln Cys Ala Asp
            660                 665                 670

Leu Cys Leu Arg Leu Leu Arg His Cys Ser Ser Ser Ile Gly Thr Ile
        675                 680                 685

Arg Ser His Pro Ser Ala Ser Leu Tyr Leu Leu Met Arg Gln Asn Phe
    690                 695                 700

Glu Ile Gly Asn Asn Phe Ala Arg Val Lys Met Gln Val Pro Met Ser
705                 710                 715                 720

Leu Ser Ser Leu Val Gly Thr Ser Gln Asn Phe Asn Glu Glu Phe Leu
            725                 730                 735

Arg Arg Ser Leu Lys Thr Ile Leu Thr Tyr Ala Glu Glu Asp Leu Glu
            740                 745                 750

Leu Arg Glu Thr Thr Phe Pro Asp Gln Val Gln Asp Leu Val Phe Asn
        755                 760                 765

Leu His Met Ile Leu Ser Asp Thr Val Lys Met Lys Glu His Gln Glu
    770                 775                 780

Asp Pro Glu Met Leu Ile Asp Leu Met Tyr Arg Ile Ala Lys Gly Tyr
785                 790                 795                 800

Gln Thr Ser Pro Asp Leu Arg Leu Thr Trp Leu Gln Asn Met Ala Gly
            805                 810                 815

Lys His Ser Glu Arg Ser Asn His Ala Glu Ala Ala Gln Cys Leu Val
            820                 825                 830

His Ser Ala Ala Leu Val Ala Glu Tyr Leu Ser Met Leu Glu Asp Arg
        835                 840                 845

Lys Tyr Leu Pro Val Gly Cys Val Thr Phe Gln Asn Ile Ser Ser Asn
    850                 855                 860

Val Leu Glu Glu Ser Ala Val Ser Asp Asp Val Val Ser Pro Asp Glu
865                 870                 875                 880
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Ala Val Asn Glu Val Tyr Lys Val Leu Ile Pro Ile His Glu Ala Asn
        915                 920                 925

Arg Asp Ala Lys Lys Leu Ser Thr Ile His Gly Lys Leu Gln Glu Ala
        930                 935                 940

Phe Ser Lys Ile Val His Gln Ser Thr Gly Trp Glu Arg Met Phe Gly
945                 950                 955                 960

Thr Tyr Phe Arg Val Gly Phe Tyr Gly Thr Lys Phe Gly Asp Leu Asp
                965                 970                 975

Glu Gln Glu Phe Val Tyr Lys Glu Pro Ala Ile Thr Lys Leu Ala Glu
                980                 985                 990

Ile Ser His Arg Leu Glu Gly Phe Tyr Gly Glu Arg Phe Gly Glu Asp
        995                 1000                1005

Val Val Glu Val Ile Lys Asp Ser Asn Pro Val Asp Lys Cys Lys Leu
    1010                1015                1020

Asp Pro Asn Lys Ala Tyr Ile Gln Ile Thr Tyr Val Glu Pro Tyr Phe
1025                1030                1035                1040

Asp Thr Tyr Glu Met Lys Asp Arg Ile Thr Tyr Phe Asp Lys Asn Tyr
                1045                1050                1055

Asn Leu Arg Arg Phe Met Tyr Cys Thr Pro Phe Thr Leu Asp Gly Arg
                1060                1065                1070

Ala His Gly Glu Leu His Glu Gln Phe Lys Arg Lys Thr Ile Leu Thr
        1075                1080                1085

Thr Ser His Ala Phe Pro Tyr Ile Lys Thr Arg Val Asn Val Thr His
    1090                1095                1100

Lys Glu Glu Ile Ile Leu Thr Pro Ile Glu Val Ala Ile Glu Asp Met
1105                1110                1115                1120

Gln Lys Lys Thr Gln Glu Leu Ala Phe Ala Thr His Gln Asp Pro Ala
                1125                1130                1135

Asp Pro Lys Met Leu Gln Met Val Leu Gln Gly Ser Val Gly Thr Thr
                1140                1145                1150

Val Asn Gln Gly Pro Leu Glu Val Ala Gln Val Phe Leu Ser Glu Ile
        1155                1160                1165

Pro Ser Asp Pro Lys Leu Phe Arg His His Asn Lys Leu Arg Leu Cys
    1170                1175                1180

Phe Lys Asp Phe Thr Lys Arg Cys Glu Asp Ala Leu Arg Lys Asn Lys
1185                1190                1195                1200
```

<210> 15
<211> 987
<212> PRT
<213> Homo sapiens

<220>
<223> human CLASP-5

<400> 15

```
Met Asn Ala Asp Thr Ala Pro Thr Ser Pro Cys Pro Ser Ile Ser Ser
  1               5                  10                  15

Gln Asn Ser Ser Ser Cys Ser Ser Phe Gln Asp Gln Lys Ile Ala Ser
                20                  25                  30

Met Phe Asp Arg Thr Ser Arg Val Pro Ala Ser Ser Thr Ser Ser Pro
                35                  40                  45

Gly Leu Leu Phe Thr Glu Leu Ala Ala Ala Leu Asp Ala Glu Gly Glu
        50                  55                  60

Gly Ile Ser Glu Val Gln Arg Lys Ala Val Ser Ala Ile His Ser Leu
 65                  70                  75                  80

Leu Ser Ser His Asp Leu Asp Pro Arg Cys Val Lys Pro Glu Val Lys
                85                  90                  95

Val Lys Ile Ala Ala Leu Tyr Leu Pro Leu Val Gly Ile Ile Leu Asp
               100                 105                 110

Ala Leu Pro Gln Leu Cys Asp Phe Thr Val Ala Asp Thr Arg Arg Tyr
           115                 120                 125

Arg Thr Ser Gly Ser Asp Glu Glu Gln Glu Gly Ala Gly Ala Ile Thr
       130                 135                 140

Gln Asn Val Ala Leu Ala Ile Ala Gly Asn Asn Phe Asn Leu Lys Thr
145                 150                 155                 160

Ser Gly Ile Val Leu Ser Ser Leu Pro Tyr Lys Gln Tyr Asn Met Leu
               165                 170                 175

Asn Ala Asp Thr Thr Arg Asn Leu Met Ile Cys Phe Leu Trp Ile Met
           180                 185                 190

Lys Asn Ala Asp Gln Ser Leu Ile Arg Lys Trp Ile Ala Asp Leu Pro
           195                 200                 205

Ser Thr Gln Leu Asn Arg Ile Leu Asp Leu Leu Phe Ile Cys Val Leu
       210                 215                 220

Cys Phe Glu Tyr Lys Gly Lys Gln Ser Ser Asp Lys Val Ser Thr Gln
225                 230                 235                 240
```

```
Gly Asn Asp Arg Phe Pro Gly Leu Asn Glu Asn Leu Arg Trp Lys Lys
        275             280             285

Glu Gln Thr His Trp Arg Gln Ala Asn Glu Lys Leu Asp Lys Thr Lys
        290             295             300

Ala Glu Leu Asp Gln Glu Ala Leu Ile Ser Gly Asn Leu Ala Thr Glu
305             310             315             320

Ala His Leu Ile Ile Leu Asp Met Gln Glu Asn Ile Ile Gln Ala Ser
            325             330             335

Ser Ala Leu Asp Cys Lys Asp Ser Leu Leu Gly Gly Val Leu Arg Val
            340             345             350

Leu Val Asn Ser Leu Asn Cys Asp Gln Ser Thr Thr Tyr Leu Thr His
            355             360             365

Cys Phe Ala Thr Leu Arg Ala Leu Ile Ala Lys Phe Gly Asp Leu Leu
    370             375             380

Phe Glu Glu Glu Val Glu Gln Cys Phe Asp Leu Cys His Gln Val Leu
385             390             395             400

His His Cys Ser Ser Ser Met Asp Val Thr Arg Ser Gln Ala Cys Ala
            405             410             415

Thr Leu Tyr Leu Leu Met Arg Phe Ser Phe Gly Ala Thr Ser Asn Phe
            420             425             430

Ala Arg Val Lys Met Gln Val Thr Met Ser Leu Ala Ser Leu Val Gly
        435             440             445

Arg Ala Pro Asp Phe Asn Glu Glu His Leu Arg Arg Ser Leu Arg Thr
    450             455             460

Ile Leu Ala Tyr Ser Glu Glu Asp Thr Ala Met Gln Met Thr Pro Phe
465             470             475             480

Pro Thr Gln Val Glu Glu Leu Leu Cys Asn Leu Asn Ser Ile Leu Tyr
            485             490             495

Asp Thr Val Lys Met Arg Glu Phe Gln Glu Asp Pro Glu Met Leu Met
            500             505             510

Asp Leu Met Tyr Arg Ile Ala Lys Ser Tyr Gln Ala Ser Pro Asp Leu
        515             520             525

Arg Leu Thr Trp Leu Gln Asn Met Ala Glu Lys His Thr Lys Lys Lys
    530             535             540

Cys Tyr Thr Glu Ala Ala Met Cys Leu Val His Ala Ala Ala Leu Val
545             550             555             560
```

Val Ser Glu Asp Thr Leu Ser Pro Asp Glu Asp Gly Val Cys Ala Gly
        595   600   605

Gln Tyr Phe Thr Glu Ser Gly Leu Val Gly Leu Leu Glu Gln Ala Ala
610   615   620

Glu Leu Phe Ser Thr Gly Gly Leu Tyr Glu Thr Val Asn Glu Val Tyr
625   630   635   640

Lys Leu Val Ile Pro Ile Leu Glu Ala His Arg Glu Phe Arg Lys Leu
                645   650   655

Thr Leu Thr His Ser Lys Leu Gln Arg Ala Phe Asp Ser Ile Val Asn
            660   665   670

Lys Asp His Lys Arg Met Phe Gly Thr Tyr Phe Arg Val Gly Phe Phe
            675   680   685

Gly Ser Lys Phe Gly Asp Leu Asp Glu Gln Glu Phe Val Tyr Lys Glu
    690   695   700

Pro Ala Ile Thr Lys Leu Pro Glu Ile Ser His Arg Leu Glu Ala Phe
705   710   715   720

Tyr Gly Gln Cys Phe Gly Ala Glu Phe Val Glu Val Ile Lys Asp Ser
            725   730   735

Thr Pro Val Asp Lys Thr Lys Leu Asp Pro Asn Lys Ala Tyr Ile Gln
            740   745   750

Ile Thr Phe Val Glu Pro Tyr Phe Asp Glu Tyr Glu Met Lys Asp Arg
            755   760   765

Val Thr Tyr Phe Glu Lys Asn Phe Asn Leu Arg Arg Phe Met Tyr Thr
770   775   780

Thr Pro Phe Thr Leu Glu Gly Arg Pro Arg Gly Glu Leu His Glu Gln
785   790   795   800

Tyr Arg Arg Asn Thr Val Leu Thr Thr Met His Ala Phe Pro Tyr Ile
            805   810   815

Lys Thr Arg Ile Ser Val Ile Gln Lys Glu Glu Phe Val Leu Thr Pro
            820   825   830

Ile Glu Val Ala Ile Glu Asp Met Lys Lys Lys Thr Leu Gln Leu Ala
            835   840   845

Val Ala Ile Asn Gln Glu Pro Pro Asp Ala Lys Met Leu Gln Met Val
    850   855   860

Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln Gly Pro Leu Glu Val
865   870   875   880

```
Gly Glu Ala Val Glu Lys Asn Lys Arg Leu Ile Thr Ala Asp Gln Arg
        915                 920             925

Glu Tyr Gln Gln Glu Leu Lys Lys Asn Tyr Asn Lys Leu Lys Glu Asn
        930             935             940

Leu Arg Pro Met Ile Glu Arg Lys Ile Pro Glu Leu Tyr Lys Pro Ile
945                 950             955             960

Phe Arg Val Glu Ser Gln Lys Arg Asp Ser Phe His Arg Ser Ser Phe
                965             970             975

Arg Lys Cys Glu Thr Gln Leu Ser Gln Gly Ser
            980             985
```

<210> 16
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from human CLASP-1

<400> 16
```
Tyr Arg Val Ala Phe Tyr Gly Gln Gly Phe Phe Glu Glu Glu Glu Gly
 1               5               10              15

Lys Glu Tyr Ile Tyr Lys Glu Pro
            20
```

<210> 17
<211> 38
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from human KIAA1058

<400> 17
```
Phe Arg Val Ala Phe Phe Gly Gln Ala Ala Gln Tyr Gln Phe Thr Asp
 1               5               10              15

Ser Glu Thr Asp Val Glu Gly Phe Phe Glu Asp Glu Asp Gly Lys Glu
            20              25              30

Tyr Ile Tyr Lys Glu Pro
            35
```

<210> 18

<223> Description of Artificial Sequence:DOCK motifs A
      from human CLASP-2

<400> 18
Phe Glu Asp Glu Asp Gly Lys Glu Tyr Ile Tyr Lys Glu Pro
 1   5   10

<210> 19
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from human CLASP-6

<400> 19
Phe Arg Val Ala Phe Phe Gly Gln Gly Phe Phe Glu Asp Glu Asp Gly
 1   5   10   15

Lys Glu Tyr Ile Tyr Lys Glu Pro
            20

<210> 20
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from human CLASP-4

<400> 20
Phe Arg Val Ala Phe Tyr Gly Gln Ser Phe Phe Glu Glu Glu Asp Gly
 1   5   10   15

Lys Glu Tyr Ile Tyr Lys Glu Pro
            20

<210> 21
<211> 31
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from canonical DOCK180

<400> 21
Phe Ala Val Gly Tyr Tyr Gly Gln Gly Phe Pro Thr Phe Leu Arg Gly
 1   5   10   15

Lys Val Phe Ile Tyr Arg Gly Lys Glu Tyr Glu Arg Arg Glu Asp
            20   25   30

<210> 161
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from canonical DOCK2

<400> 22
Phe Ala Val Gly Tyr Tyr Gly Gln Gly Phe Pro Ser Phe Leu Arg Asn
 1   5   10   15

Lys Val Phe Ile Tyr Arg Gly Lys Glu Tyr Glu Arg Arg Glu Asp
            20   25   30

<210> 23
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from canonical DOCK3

<400> 23
Phe Arg Val Gly Phe Tyr Gly Arg Lys Phe Pro Phe Phe Leu Arg Asn
 1   5   10   15

Lys Glu Tyr Val Cys Arg Gly His
            20

<210> 24
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from human KIAA0716

<400> 24
Phe Arg Val Gly Phe Tyr Gly Lys Lys Phe Pro Phe Phe Leu Arg Asn
 1   5   10   15

Lys Glu Phe Val Cys Arg Gly His
            20

<210> 25
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs A
      and B from human CLASP 3

Glu Phe Val Tyr Lys Glu Pro
            20

<210> 26
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from rat TRG

<400> 26
Pro Lys Leu Thr Pro Leu Ser Glu Ile Ser Gln Arg Leu Leu Lys Leu
 1   5   10   15

Tyr Ser Asp Lys Phe Gly Ser Glu Asn Val Lys Met Ile Gln Asp Ser
            20   25   30

Gly Lys Val Asn Pro Lys Asp Leu Asp Ser Lys Phe Ala Tyr Ile Gln
            35   40   45

Val Thr His Val Thr Pro Phe Phe Asp Glu Lys Glu
        50   55   60

<210> 27
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from human CLASP-1

<400> 27
Pro Lys Leu Thr Gly Leu Ser Glu Ile Ser Gln Arg Leu Leu Lys Leu
 1   5   10   15

Tyr Ala Asp Lys Phe Gly Ala Asp Asn Val Lys Ile Ile Gln Asp Ser
            20   25   30

Asn Lys Val Asn Pro Lys Asp Leu Asp Pro Lys Tyr Ala Tyr Ile Gln
            35   40   45

Val Thr Tyr Val Thr Pro Phe Phe Glu Glu Lys Glu
        50   55   60

<210> 28
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from human CLASP-2

Tyr Ser Asp Lys Phe Gly Ser Glu Asn Val Lys Met Thr Ile Asp Met
            20   25   30

Gly Lys Val Asn Pro Lys Asp Leu Asp Ser Lys Tyr Ala Tyr Ile Gln
            35   40   45

Val Thr His Val Ile Pro Phe Phe Asp Glu Lys Glu
            50   55   60

<210> 29
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from human CLASP-4

<400> 29
Pro Lys Leu Thr Gly Leu Ser Glu Ile Ser Leu Arg Leu Val Lys Leu
  1   5   10   15

Tyr Gly Glu Lys Phe Gly Thr Glu Asn Val Lys Ile Ile Gln Asp Ser
            20   25   30

Asp Lys Val Asn Ala Lys Glu Leu Asp Pro Lys Tyr Ala His Ile Gln
            35   40   45

Val Thr Tyr Val Lys Pro Tyr Phe Asp Asp Lys Glu
            50   55   60

<210> 30
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from human CLASP-3

<400> 30
Pro Ala Ile Thr Lys Leu Ala Glu Ile Ser His Arg Leu Glu Gly Phe
  1   5   10   15

Tyr Gly Glu Arg Phe Gly Glu Asp Val Val Glu Val Ile Lys Asp Ser
            20   25   30

Asn Pro Val Asp Lys Cys Lys Leu Asp Pro Asn Lys Ala Tyr Ile Gln
            35   40   45

Ile Thr Tyr Val Glu Pro Tyr Phe Asp Thr Tyr Glu
            50   55   60

<210> 31

<223> Description of Artificial Sequence:DOCK motif C
      from human KIAA0716

<400> 31

```
His Asp Tyr Glu Arg Leu Glu Ala Phe Gln Gln Arg Met Leu Asn Glu
  1               5                  10                  15

Phe Pro His Ala Ile Ala Met Gln His Ala Asn Gln Pro Asp Glu Thr
             20                  25                  30

Ile Phe Gln Ala Glu Ala Gln Tyr Leu Gln Ile Tyr Ala Val Thr Pro
             35                  40                  45

Ile Pro Glu Ser Gln Glu
         50
```

<210> 32
<211> 54
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from canonical DOCK3

<400> 32

```
His Asp Tyr Glu Arg Leu Glu Ala Phe Gln Gln Arg Met Leu Ser Glu
  1               5                  10                  15

Phe Pro Gln Ala Val Ala Met Gln His Pro Asn His Pro Asp Asp Ala
             20                  25                  30

Ile Leu Gln Cys Asp Ala Gln Tyr Leu Gln Ile Tyr Ala Val Thr Pro
             35                  40                  45

Ile Pro Asp Tyr Val Asp
         50
```

<210> 33
<211> 46
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
      from Canonical DOCK2

<400> 33

```
Phe Gln Met Gln Leu Met Thr Gln Phe Pro Asn Ala Glu Lys Met Asn
  1               5                  10                  15

Thr Thr Ser Ala Pro Gly Asp Asp Val Lys Asn Ala Pro Gly Gln Tyr
             20                  25                  30

Ile Gln Cys Phe Thr Val Gln Pro Val Leu Asp Glu His Pro
```

<211> ..
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motif C
    from Canonical DOCK180

<400> 34
Glu Tyr Glu Arg Arg Glu Asp Phe Gln Met Gln Leu Met Thr Gln Phe
 1   5   10   15

Pro Asn Ala Glu Lys Met Asn Thr Thr Ser Ala Pro Gly Asp Asp Val
            20   25   30

Lys Asn Ala Pro Gly Gln Tyr Ile Gln Cys Phe Thr Val Gln Pro Val
            35   40   45

Leu Asp Glu His Pro
        50

<210> 35
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
    and E from human CLASP-1

<400> 35
Arg Thr Ile Leu Thr Thr Ser His Leu Phe Pro Tyr Val Lys Lys Arg
 1   5   10   15

Ile Gln Val Ile Ser Gln Ser Ser Thr Glu Leu Asn Pro Ile Glu Val
            20   25   30

Ala Ile Asp Glu Met Ser Arg Lys Val Ser Glu Leu Asn
            35   40   45

<210> 36
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
    and E from rat TRG

<400> 36
Arg Thr Ile Leu Thr Ala Ile His Cys Phe Pro Tyr Val Lys Lys Arg
 1   5   10   15

Ile Pro Val Met Tyr Gln His His Thr Asp Leu Asn Pro Ile Glu Val
            20   25   30

<210> 37
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
      and E from human KIAA1058

<400> 37
Arg Thr Ile Leu Thr Ala Ile His Cys Phe Pro Tyr Val Lys Lys Arg
 1   5   10   15

Ile Pro Val Met Tyr Gln His His Thr Asp Leu Asn Pro Ile Glu Val
            20   25   30

Ala Ile Asp Glu Met Ser Lys Lys Val Ala Glu Leu Arg
        35   40   45

<210> 38
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
      and E from human CLASP-2

<400> 38
Arg Thr Ile Leu Thr Ala Ile His Cys Phe Pro Tyr Val Lys Lys Arg
 1   5   10   15

Ile Pro Val Met Tyr Gln His His Thr Asp Leu Asn Pro Ile Glu Val
            20   25   30

Ala Ile Asp Glu Met Ser Lys Lys Val Ala Glu Leu Arg
        35   40   45

<210> 39
<211> 44
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
      and E from human CLASP-6

<400> 39
Arg Thr Ile Leu Thr Ala Ile His Cys Phe Pro Tyr Val Lys Lys Arg
 1   5   10   15

Ile Pro Phe Met Tyr Gln His His Thr Asp Leu Asn Pro Ile Glu Val

<210> 40
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
      and E from human CLASP-4

<400> 40
Arg Thr Ile Leu Thr Thr Ser Asn Ser Phe Pro Tyr Val Lys Lys Arg
 1   5   10   15

Ile Pro Ile Asn Cys Glu Gln Gln Ile Asn Leu Lys Pro Ile Asp Val
            20   25   30

Ala Thr Asp Glu Ile Lys Asp Lys Thr Ala Glu Leu Gln
        35   40   45

<210> 41
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
      and E from human CLASP-3

<400> 41
Lys Thr Ile Leu Thr Thr Ser His Ala Phe Pro Tyr Ile Lys Thr Arg
 1   5   10   15

Val Asn Val Thr His Lys Glu Glu Ile Ile Leu Thr Pro Ile Glu Val
            20   25   30

Ala Ile Glu Asp Met Gln Lys Lys Thr Gln Glu Leu Ala
        35   40   45

<210> 42
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
      and E from human CLASP-5

<400> 42
Asn Thr Val Leu Thr Thr Met His Ala Phe Pro Tyr Ile Lys Thr Arg
 1   5   10   15

Ile Ser Val Ile Gln Lys Glu Glu Phe Val Leu Thr Pro Ile Glu Val

<210> 43
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
     and E from human KIAA0716

<400> 43
Arg Thr Ser Leu Tyr Leu Val Gln Ser Leu Pro Gly Ile Ser Arg Trp
 1   5   10   15

Phe Glu Val Glu Lys Arg Glu Val Val Glu Met Ser Pro Leu Glu Asn
             20   25   30

Ala Ile Glu Val Leu Glu Asn Lys Asn Gln Gln Leu Lys
         35   40   45

<210> 44
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
     and E from canonical DOCK2

<400> 44
Arg Thr Ser Phe Val Thr Ala Tyr Lys Leu Pro Gly Ile Leu Arg Trp
 1   5   10   15

Phe Glu Val Val His Met Ser Gln Thr Thr Ile Ser Pro Leu Glu Asn
             20   25   30

Ala Ile Glu Thr Met Ser Thr Ala Asn Glu Lys Ile Leu
         35   40   45

<210> 45
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
     and E from canonical DOCK3

<400> 45
Arg Thr Thr Leu Thr Leu Thr His Ser Leu Pro Gly Ile Ser Arg Trp
 1   5   10   15

Phe Glu Val Glu Arg Arg Glu Leu Val Glu Val Ser Pro Leu Glu Asn

<210> 46
<211> 45
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs D
and E from canonical DOCK180

<400> 46
Arg Thr Ser Phe Val Thr Ala Tyr Lys Leu Pro Gly Ile Leu Arg Trp
1   5   10   15

Phe Glu Val Val His Met Ser Gln Thr Thr Ile Ser Pro Leu Glu Asn
            20   25   30

Ala Ile Glu Thr Met Ser Thr Ala Asn Glu Lys Ile Leu
        35   40   45

<210> 47
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
and G from human CLASP-1

<400> 47
Ser Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Lys Val Asn Ala
1   5   10   15

Gly Pro Met Ala Tyr Ala Arg Ala Phe Leu Glu Glu Thr Asn Ala Lys
            20   25   30

Lys Tyr Pro Asp Asn Gln Val Lys Leu Leu Lys Glu Ile Phe Arg Gln
        35   40   45

Phe Ala Asp Ala Cys Gly Gln Ala Leu Asp
    50   55

<210> 48
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
and G from rat TRG

<400> 48
Lys Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Gln Val Asn Ala

Arg Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val His Arg His
        35   40   45

Phe Val Glu Ala Cys Gly Gln Ala Leu Ala
        50   55

<210> 49
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from human KIAA1058

<400> 49
Lys Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Gln Val Asn Ala
  1   5   10   15

Gly Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asp Asp Thr Asn Thr Lys
                20   25   30

Arg Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val Phe Arg Gln
                35   40   45

Phe Val Glu Ala Cys Gly Gln Ala Leu Ala
        50   55

<210> 50
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from human CLASP-2

<400> 50
Lys Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Gln Val Asn Ala
  1   5   10   15

Gly Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asp Asp Thr Asn Thr Lys
                20   25   30

Arg Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val Phe Arg Gln
                35   40   45

Phe Val Glu Ala Cys Gly Gln Ala Leu Ala
        50   55

<210> 51
<211> 58
<212> PRT
<213> Artificial Sequence

<400> 51
Lys Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Gln Val Asn Ala
1   5   10   15

Gly Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asp Asp Thr Asn Thr Lys
                20   25   30

Arg Tyr Pro Asp Asn Lys Val Lys Leu Leu Lys Glu Val Phe Arg Gln
                35   40   45

Phe Val Glu Ala Cys Gly Gln Ala Leu Ala
        50   55

<210> 52
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from human CLASP-3

<400> 52
Met Leu Gln Met Val Leu Gln Gly Ser Val Gly Thr Thr Val Asn Gln
1   5   10   15

Gly Pro Leu Glu Val Ala Gln Val Phe Leu Ser Glu Ile Pro Ser Asp
                20   25   30

Pro Lys Leu Phe Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Asp
                35   40   45

Phe Thr Lys Arg Cys Glu Asp Ala Leu Arg
        50   55

<210> 53
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from human CLASP 4

<400> 53
Gln Leu Gln Leu Lys Leu Gln Gly Cys Val Ser Val Gln Val Asn Ala
1   5   10   15

Gly Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asn Asp Ser Gln Ala Ser
                20   25   30

Lys Tyr Pro Pro Lys Lys Val Ser Glu Leu Lys Asp Met Phe Arg Lys

<210> 54
<211> 58
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from human CLASP-5

<400> 54
Met Leu Gln Met Val Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln
  1   5   10   15

Gly Pro Leu Glu Val Ala Gln Val Phe Leu Ala Glu Ile Pro Ala Asp
              20   25   30

Pro Lys Leu Tyr Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Glu
          35   40   45

Phe Ile Met Arg Cys Gly Glu Ala Val Glu
      50   55

<210> 55
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from human KIAA0716

<400> 55
Pro Leu Thr Met Cys Leu Asn Gly Val Ile Asp Ala Ala Val Asn Gly
  1   5   10   15

Gly Val Ser Arg Tyr Gln Glu Ala Phe Phe Val Lys Glu Tyr Ile Leu
              20   25   30

Ser His Pro Glu Asp Gly Glu Lys Ile Ala Arg Leu Arg Glu Leu Met
          35   40   45

Leu Glu Gln Ala Gln Ile Leu Glu Phe Gly Leu Ala
      50   55   60

<210> 56
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from canonical DOCK2

Gly Phe Ala Lys Tyr Glu Tyr Ala Phe Ile Thr Ile Ala Tyr Val Arg
              20   25   30

Asp His Pro Glu Asp Gln Asp Lys Leu Thr His Leu Lys Asp Leu Ile
        35   40   45

Ala Trp Gln Ile Pro Phe Leu Gly Ala Gly Ile Lys
    50   55   60

<210> 57
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from canonical DOCK3

<400> 57
Leu Leu Ser Met Cys Leu Asn Gly Val Ile Asp Ala Ala Val Asn Gly
    1   5   10   15

Gly Ile Ala Arg Tyr Gln Glu Ala Phe Phe Asp Lys Asp Tyr Ile Asn
                20   25   30

Lys His Pro Gly Asp Ala Glu Lys Ile Thr Gln Leu Lys Glu Leu Met
        35   40   45

Gln Glu Gln Val His Val Leu Gly Val Gly Leu Ala
    50   55   60

<210> 58
<211> 60
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:DOCK motifs F
      and G from canonical DOCK180

<400> 58
Pro Leu Ser Met Leu Leu Asn Gly Ile Val Asp Pro Ala Val Met Gly
    1   5   10   15

Gly Phe Ala Lys Tyr Glu Lys Ala Phe Phe Thr Glu Glu Tyr Val Arg
                20   25   30

Asp His Pro Glu Ala His Glu Lys Ile Glu Lys Leu Lys Asp Leu Ile
        35   40   45

Ala Trp Gln Ile Pro Phe Leu Ala Glu Gly Ile Arg
    50   55   60

<210> 59

```
<220>
<223> Description of Artificial Sequence:Ref 1.1
      sequence of bacterial artificial chromosome BAC19
      using primer HC5S11

<220>
<221> modified_base
<222> (1)..(598)
<223> n = g, a, c or t

<400> 59
ctctctgtct tcatatcttc caggttataa agnattattt actaaaagaa nattcangct 60
atttcattta actagctcag tttaatcatg tatttcctat aaaggttagt cttattaatt 120
tgacaaaaca atcaaacaat tcaaaccaga tcaagtatgc taccctgaag ttacaccact 180
agctaagaat taacaatcta agtaattggt ttctccccag gctcaaggct ccctgatcag 240
gttaagtaaa gccaagaatc caataagccc tatgaaattt agaaactcat agaaaagtct 300
caaatcttct tgtctgacat tagccaattg ttatattatg caaatagagg attncaagta 360
aataagtttg gaacctgttt accaggtttt tgcagcagnc ctctaagagc ttaactggtc 420
atgcattgaa tgccgagagc aaagaggaat ggagaggggn tgtaagnggt tccaatntta 480
ctggaaccca ccactatctt tngaagtctt gatacttaac tgngtgtagn ctctttaggc 540
ctntantaan tagaatctat atggattcgt gttctgtcng caagnagtgc ctatgaaa   598


<210> 60
<211> 625
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Ref 2.1
      sequence of bacterial artificial chromosome BAC19
      using primer HC5AS10b

<220>
<221> modified_base
<222> (1)..(625)
<223> n = g, a, c or t

<400> 60
tgcgagtagt gtccgcgttc agcatgttgt actgcttata gggctgaagg gaggcacgat 60
tggggatgg aggccaggga agaagtcaag caacagaaaa atttgaggct taacagtcaa 120
gcaacagaaa aattcaaagt gttctcttaa aataccatga ctgtacatca ctgctaggct 180
ggagatctat tgccagtagc cctgccttcc ctaggcaggg gaagctgtgt tctttgagta 240
gcgctactca gcaaagaggc tcacctgggg cagtatttga gctaggcttt cagccaccgt 300
atctgagtac ctctgtctta ngagcagtgt ggcctggtga tcacccctgg gccttgatca 360
tgcgtgctgc aatcccagtg atacaaagag gctttcatgc tgctaagatc tccaagtatt 420
tctccttcgt gctgggcagc agagggttag acttncaggg gagaaggaaa ctggctgggt 480
gccatgaata ancttgctgt tcaagantta acttctttgt tacataagng caaaggtata 540
acataaaggg ncatgaactg ctcaacnaaa ttnatcaaat ccatgtttgt gggagttctt 600
ttgtnatngg aagtttaacc cctaa                                       625


<210> 61
<211> 684
```

<220>
<221> modified_base
<222> (1)..(684)
<223> n = g, a, c or t

<400> 61
cccngctctt tttggcaang taaacttggg atgcttgttt tcttcctctt aattaagagn 60
aaganttttt ttagcttcat acttctctct tcagggggac caaaagtcac agagcatatt 120
aagtggcana accccnaagg tcttaagtct tcctaggaag aaagcagatg ccctgattct 180
gtgggaagcc accatggaga ggaaaagcag tggctcccat atttgaagtg nggacctaac 240
tctagaaagt ttaaaanggc catttgctga agggctatga catgagaaca gagatcaact 300
gagtgactta gcaanttcac tctttctctg taanacctct ggtgagtgag antaaatcct 360
ntatgtgacg cccattagtc ttacaaaang tcatgccnta aaatgccang aaggncagaa 420
atgaatttct caccgccnga ggaatgagga ttatnctggg gggacatgca naaatattnn 480
nccccccnatt tattnattta tttatttttg agacngagtn tcgntctaat cgccccccagg 540
ctggnaggtg gnaggtggtt cccatcttna ancttanntn ggaaggncct ctttgngccc 600
cngggggggng naaagngaat tccctaaatg cctncanncc cctccctgga ngttatttgg 660
gggnnttnta aagggcngtg gcng 684

<210> 62
<211> 450
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Ref 4.1
      sequence of bacterial artificial chromosome BAC13
      using primer C5S7

<220>
<221> modified_base
<222> (1)..(450)
<223> n = g, a, c or t

<400> 62
acaaaaacta accatcantc tctaaatccc aacaancttt ttttaagaat acctaangag 60
ctcaacnagg gggactntcc aangcactta aatgcagnca aacnacnccn ncaagagngg 120
caactactaa tggggcanat ctnaaagaaa atatagncaa aggnnggaat cataataggga 180
gcnaccactt angaagcacc aactgggggac ctggaactgn atnaggncct ctacatacat 240
catnnnatan catcctgcaa cgacccctgg aaggaganag anggnattcc tannntagag 300
angaganaac tggggacatg ggaagaggna agcgaagggt tcaaggggan gnaagcgagc 360
agannccagg gnctcanact ngngggggnnt gggggggntnc tgnnncccta cncttngnan 420
gaacagngnn gttganntgg cttttnganta 450

<210> 63
<211> 502
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Ref 5.1
      sequence of bacterial artificial chromosome BAC13

<400> 63
```
ccannagatt nttgnaacgn nggtaggctt cctttgtaga tttattgaaa atgtttcgta 60
cttctacaag tttgccctgc cttcctataa agagtgaaan tcantttgaa tcgactggtg 120
gataattntt ccatttttcc tcaggcaatt tngagttact ccaataaatt caaatatggg 180
ccagaggaaa tcatctttca gatgggcagt gattggccag tcagcaggag aagctgctta 240
tgccttgttt ggtacattgt ggaaaaacac actttaataa atacgcantc atgcctgagt 300
acccatcctc catcccgcca ccccccagta tggcaaaaat ctggtcagag tccatttggg 360
aataattcca tggttcctgg gatcccaaag cttccagaag tgctggctga tcaanggagt 420
gtacagtcag tcctgggtgg caaaaatgtc ccatttttta agtaccaagc aaaggttcct 480
tcttncaagg gttnctaggg cc                                         502
```

<210> 64
<211> 202
<212> DNA
<213> Homo sapiens

<220>
<223> 1st partial exon

<400> 64
```
ccagctgtca gccaagctca gtaaccttcc aacgctcatt tccatgaggc tagagttcct 60
gagaatcctc tgtagccatg agcattacct caatctgaac cttttttta tgaatgctga 120
tactgctcca acatctcctt gtccttccat atcttcccag gtaataaaag aattatttaa 180
ctaaaagaat tattcaagct at                                         202
```

<210> 65
<211> 205
<212> DNA
<213> Homo sapiens

<220>
<223> 2nd exon

<400> 65
```
gctcataaaa tggctcctta cgtttctgta gaactcaagc tcctgctcca gcttccagga 60
ccagaagatc gccagcatgt tcgatctgac ttccgagtac cgccagcagc acttcctcac 120
cgggctcctc ttcacagaac tggctgctgc cctggatgcc gaaggggaag ggtatgtttc 180
tggcatttaa aatggaagat gaagc                                      205
```

<210> 66
<211> 235
<212> DNA
<213> Homo sapiens

<220>
<223> 3rd exon

<400> 66
```
cataacctct tgattcctgt gttgtgccaa cagaatcagc aaagtacaaa ggaaagctgt 60
cagtgcaatt cacagcctgc taagttctca cgacctggac ccacgctgtg tcaaactaga 120
ggtgaaggtc aaaatcgccg ccctttacct acctttagtt ggcatcattt tggatgcttt 180
```

<212> DNA
<213> Homo sapiens

<220>
<223> 4th exon

<400> 67
tgtttgactt gacatcacaa acgatgtttt cattgcagtt gcagatactc gcagataccg 60
caccagtggc tcggatgaag aacaagaagg agccggtgcc attaaccaga atgtggctct 120
ggccatagca gggaataatt tcaatttgaa aacaagtgga atagtgctgt cttccttggt 180
atgttggtgc acatgtgtct ggttgatttt tcat 214

<210> 68
<211> 247
<212> DNA
<213> Homo sapiens

<220>
<223> 5th exon

<400> 68
tggcctccat cccccaatct gcctcccttc agccctataa gcagtacaac atgctgaacg 60
cggacactac tcgcaacctc atgatctgct tcctctggat catgaaaaat gctgatcaga 120
gcctcattag gaagtggatt gctgacctgc catcaacgca gctcaacagg attttagatc 180
tacttttcat ctgtgtgtta tgttttgagt ataaggtaag tctggagtgg cacaacttta 240
taccagc 247

<210> 69
<211> 205
<212> DNA
<213> Homo sapiens

<220>
<223> 6th exon

<400> 69
caccaaagga catgtcctcc tacctctgtc ttgtccaggg aaaacagagt tctgacaaag 60
tcagtaccca agtcctgcag aagtcaaggg atgtcaaggc ccggctggaa gaggctttgc 120
tgcgtgggga aggggccaga ggggagatga tgcgccgccg ggctccaggt gtgttggact 180
ggcccttccc tgctctctgt caagc 205

<210> 70
<211> 156
<212> DNA
<213> Homo sapiens

<220>
<223> 7th exon

<400> 70
tcaaattcct atcatgcatt tcttaactcc tagggaacga ccgatttcca ggcctaaatg 60
aaaatttgag atggaagaaa gagcagacac attggcggca agctaatgag aagctagata 120
agtgagtcac tcggcaactt tctgctactt ttacct 156

<220>
<223> 8th exon

<400> 71
gctttaattt gacctcttgt tgtttcctag aacaaaggcc gagttagatc aagaagcctt 60
gatcagtggc aatctggcta cagaagcaca tttaatcatc ctggatatgc aggaaaacat 120
tatccaggtg aggaaaacaa acacccaatc tgatttg 157

<210> 72
<211> 203
<212> DNA
<213> Homo sapiens

<220>
<223> 9th exon

<400> 72
ggattcaatg atgctgttct tccattcccc caggcgagct cggctctgga ctgtaaagac 60
agcctgctgg gaggtgttct gagggtgctg gtgaattctc tgaactgtga tcagagtacc 120
acctacctga ctcactgctt tgcaacactc cgtgctctca tcgccaaggt aaacttggga 180
tgcttgtttt cttcctctta att 203

<210> 73
<211> 223
<212> DNA
<213> Homo sapiens

<220>
<223> 10th exon

<400> 73
agtgatgcct aatggccctt tatgtctctc ctagtttgga gacttactct tcgaagagga 60
ggtggaacag tgtttcgacc tatgtcacca agtcctgcac cactgcagca gcagcatgga 120
tgtcacccgg agccaagcct gtgccaccct ttacctcctc atgaggttca gttttggagc 180
caccagtgta agagttcaaa ccagctgagt gacctggaat cag 223

<210> 74
<211> 230
<212> DNA
<213> Homo sapiens

<220>
<223> 11th exon

<400> 74
ttacttcatc tttttttttt ttttcactga tgcagaattt tgcaagagta aagatgcaag 60
taaccatgtc cctggcatct ttggtgggaa gagcaccaga ctttaatgaa gagcacctga 120
gaagatcctt gaggacaatt ttggcctatt cagaagagga cacagccatg cagatgactc 180
cttttcccac ccaggtacac cgaagcacat accttgtctc atgcatgagt 230

<220>
<223> 12th exon

<400> 75

```
agctaagatt attttgaggc ttacactttt tgcaggtgga ggaacttctc tgtaatctga 60
atagcatctt atatgacaca gtgaaaatga gggaatttca ggaagatcct gagatgctta 120
tggatctcat gtacaggtaa gctttcctga cacactcaag ggacaccatt t            171
```

<210> 76
<211> 266
<212> DNA
<213> Homo sapiens

<220>
<223> 13th exon

<400> 76

```
tcctcaaaac tacttctcac tcaatctgtc ttcagaattg ccaagagtta ccaggcatct 60
cctgatctgc ggctgacctg gctccagaac atggcagaga aacacaccaa gaagaagtgc 120
tacacggagg ctgccatgtg cctggtgcac gccgctgcgt tagtggctga gtatctgagc 180
atgctggagg accacagcta cctgcccgtg ggcagtgtca gcttccaggt agggtgtgtg 240
cagcttttcc cttagagcag tggttc                                       266
```

<210> 77
<211> 211
<212> DNA
<213> Homo sapiens

<220>
<223> 14th exon

<400> 77

```
ctgttctcca ggcttatact gtggtctctt tcagaatatt tcttccaatg tgctggagga 60
gtctgtggtc tctgaggaca ccctgtcacc tgacgaggat ggggtgtgcg caggccagta 120
cttcaccgag agtggcctgg taggcctcct ggagcaggcc gcggagctct tcagcacggt 180
cagtgcccag agggcatccc ggggcctggc c                                 211
```

<210> 78
<211> 199
<212> DNA
<213> Homo sapiens

<220>
<223> 15th exon

<400> 78

```
aattctctct gatgctcttc tcctctttcc aagggaggct tatatgagac agttaatgag 60
gtctacaagc tggtcatccc catcctagaa gcgcatcgag aattccggaa gctgacactc 120
actcacagca agctgcagag agccttcgac agcatcgtta acaaggtagc cggggagcct 180
ggctggcagg tcttgttac                                               199
```

<210> 79
<211> 208
```

<400> 79

```
taaggagagc tttttatatt ttgttcctca ggatcataag agaatgtttg gaacctactt 60
ccgagttggt ttctttggat ccaaatttgg ggatttggat gaacaggagt ttgtctacaa 120
agagcctgca attaccaagc ttcctgagat ctcacataga ctagaggtaa gaaaagtgat 180
tctgtgcgcc tgacctggta cactttac                                    208
```

<210> 80
<211> 157
<212> DNA
<213> Homo sapiens

<220>
<223> 17th exon

<400> 80

```
aacctttata aactgttggt tcttcttacc taggcatttt atggtcaatg ttttggtgca 60
gaatttgtgg aagtgattaa agactccact cctgtggaca aaaccaagtt ggatcctaac 120
aaggtataca aaaatttaca aaaactaacc atcaagc                          157
```

<210> 81
<211> 304
<212> DNA
<213> Homo sapiens

<220>
<223> 18th exon

<400> 81

```
tcttctccct ccgtgccttt tcccccttag gcctacatac agatcacttt tgtggagccc 60
tactttgatg agtatgagat gaaagacagg gtcacatact ttgagaagaa tttcaacctc 120
cggaggttca tgtacaccac cccgttcacc ctggaggggc ggcctcgggg agagctgcat 180
gagcagtaca gaaggaacac agtcctgacc actatgcacg ccttcccta catcaagacc 240
aggatcagcg tcatccagaa ggaggaggta atgcacccaa gggattggcc accactggat 300
gagt                                                              304
```

<210> 82
<211> 207
<212> DNA
<213> Homo sapiens

<220>
<223> 19th exon

<400> 82

```
acagtgactt ccctatgttt acgtctcatg ttcagtttgt tttgacaccg attgaagttg 60
ccattgaaga catgaagaag aagaccctgc agttagcagt tgccattaac caggagccgc 120
ctgatgcaaa gatgcttcag atggtgctgc aaggctctgt gggagctact gtaaatcagg 180
taagcaaaac cagaggtggc agctcct                                     207
```

<210> 83
```
```

<400> 83
tatattcttt tttttttttt tttttttttt cccaccaggg accactggaa gtagcccaag 60
tgtttttggc tgaaattcct gctgatccaa aactctatcg acatcacaac aagttgaggt 120
tatgctttaa ggaattcatc atgaggtaag aaggaaaatg gctgggaatt tcagtagag 179

<210> 84
<211> 244
<212> DNA
<213> Homo sapiens

<220>
<223> 21st exon

<400> 84
tcatttattt ctcccacact gatattttca tctcagatgt ggtgaagctg tagagaaaaa 60
caagcgtctc atcacggcag accagaggga atatcagcag gaactcaaaa agaactataa 120
caagctaaaa gagaacctca ggccaatgat cgagcggaaa attccagaac tgtacaagcc 180
aatattcaga gttgagagtc aaaagaggta agaacagggc agaggaggcc tcttcctgtg 240
ggat 244

<210> 85
<211> 1138
<212> DNA
<213> Homo sapiens

<220>
<223> 22nd exon

<400> 85
cctccctctc ttttcttaat ttcagggact ccttccacag atctagtttc aggaaatgtg 60
aaacccagtt gtcacagggc agctaagaaa agccatcttc attcgtggag actgtggccc 120
tgcaaccctg gagaaggact tgctggtact taaaaaatgg gacatttgcc acccaggact 180
gactgtacac tccctgatca gccagcactc tggaagcttt gggatcccag gaaccatgga 240
attattccca aatggactct gaccagattt ttgccatact ggggggtggc gggatggagg 300
atgggtactc aggcatgact gcgtatttat taaagtgtgt ttttccacaa tgtaccaaac 360
aaggcataag cagcttctcc tgctgactgg ccaatcactg cccatctgag agatgatttc 420
ctctggccca tatttgaatt tattggagta actcaaattg cctgaggaaa aatggaaaaa 480
ttatccacca gtcgattcaa actgaatttc actctttata ggaaggcagg gcaaacttgt 540
aggagtacga aacattttca ataaatctac aaagggaagc cttactacaa ttccaaaaat 600
catcatggtt ggaaatttgg gaggagatta tttgtgaact tgttaccctt ttggtaatgg 660
tggactaatt gctgtatagt tatttttgtt ttattattac tgttacatta atttaacatg 720
catttataga agaatacatt caaagcactg atgtaggaga tacacggtac ttggagcagt 780
cagccaaaaa tcacagatac tgctttcact taaatggaaa caattctccg ataatgcttt 840
gctttttttc ttatgtcact cttgtgtact atctattttt ctcctctctg ggaccaagtt 900
tcttttata aagcaataat atctctgttt tcatttcaga acattgtgct gtctgtcagc 960
atatgtatat cagctacaaa atatattcaa ctttgacttc ttttgacaaa ggactttagg 1020
aaaaggagga acaaagacat tatttgagaa ttaaattata tatttttaat atgactgtga 1080
ccttgactga taataaagat gtaataagaa ttgcaagcta aaaaaaaaaa aaaaaaa 1138

<210> 86
<211> 66686
....

<400> 86

```
gttctctgtg gttagtcact tagtgacttt agataagttt ttccaatttt atgggtctta 60
atttcctcag ttttaaaata agaagggggg gttgagagat ttgagggctg atcaacgaaa 120
aggataggac cataaaaagc agtgacatac aagcttcatt gagcagcact tggacaggt 180
tacataagag cggaagcccc tcccagcatg agaacagcca taggcctgca gtgaggaggg 240
gaccatccag aggagcaggg gaactcccag gggagaggag gattagggca gaagcttata 300
gatctgggtg aggctgctcc acagcacagt agggagtctc tgggtcagag agctccaagg 360
gctgtagcag cttagggccc tgtatctgca aggctctatc ttatcattag gaaacagctg 420
tccatcgaga ttttatgggg tctgcaaagg aggcaggcac taaatggatg aaaatctgct 480
tatatgagct attttttgtta atgactgggc atggtaaaat ttgagttagg tatgagccaa 540
gggatcagca ccagtcgaca gtgaagaaat aaacaaccga ggggccaata cacagaaaca 600
atctttgact tgtttacata acacctctcc tccaaaaaaa gaaaaagaca tgactttct 660
aaaggaagtc ctgtctacag ccataccacc ctgaacgcac gcagtctcat ctaagggaag 720
tcctgataag gaagcagaat aataaaaaag aatcctaagg aaacatcaga agtccccaag 780
catccccatc ccatgcaccc tgaccctgc cctgcagcgg atcttctgtc ccaggaccca 840
ccagaataga atggcagagg gacacttcac tcctccttgc cctccctctt cagtatttag 900
gattccaggt tagtctgttt tcaaaacttt aagttgagtg tatgaaagat accctagatc 960
accactgcag acccaggctt agctactcac atgcaggcta tcttcattcc cgacagggaa 1020
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ttagttacca tttctttttt tgtttctctc cttgactcaa atgccaaaga tccctagacc 1200
aggagtcaag aagcctgcat gctgattcct gggacaccat taattacttc tgtgattggg 1260
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tatccactga ttctgtggtc tgtgtctgcc agtgacatcc acggatgtta cttagcacca 1380
ttagtggcac tcaggcctca gaaggtcact gaccccatt cgtggtgatt taattcattg 1440
atcccagctc tctagataca ggatgaactt cataccttaa gcaagttgta ttcttacaaa 1500
gtcgtctgac tttatcattt tgcataacct attatgtttt ctgccatcta aagattttgt 1560
ggcaatggat ataaccttag tctttttttaa tagtcactaa aaatagacaa atccatttcc 1620
tcaattactg tctgtcactt acaatgtgcc actaagcaaa cacccatccc ttgggtaggg 1680
gcattgtggg tcttgacctt tgggaaggaa gttttggaa tgcaccttac tcctctttc 1740
aaaacatcac tcaaattgtt tttgaaatgt ctatttttt tcttttgaga tggagtctta 1800
ctctgttgcc caggccagag tgcagtggca caatttttggc tcactgcaaa ctccgcctca 1860
caggttcaag cgattctcct tcctcaccct cccgagtagc tgggattaca ggtgtgtggc 1920
accactcccc gctaattttt gcatttttag tagagacagg gtttcaccat gttggccaga 1980
ctggtcttga actctggcct caagtgatct gcctgcctct gcctcccgaa gtgctgggat 2040
tacaggtgtg agccaccaca cccagcctga aatgtctgtc ttgaatgatg tctcaaggga 2100
cctatgaaag atacccatag tggggccttc ttttaagtgc caatgtgttg tgggttcaag 2160
ttccgatagc cggcttgacc cgacacctgt taatgagtaa cctaagtgac aggcacatga 2220
ccaagttcta atcccttcaa tgtgctggtg gctccactgg tccaaagtca gccaggagtg 2280
cacatcgaaa ggttatggga tctggtaact gtgcttacat agaagtcata tgttttggtt 2340
ttaaaataat atataatggc atttacttat tttaagtgga tgtctaacta tgaattaatt 2400
ctgtaggcaa tatgtcccac aacacattgg cttcttgtaa aatggctgaa aatatgtgtt 2460
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            20                  25                  30

Ser Leu Phe Val Lys Glu Cys Ile Lys Thr Tyr Ser Thr Asp Trp His
            35                  40                  45

Val Val Asn Tyr Lys Tyr Glu Asp Phe Ser Gly Asp Phe Arg Met Leu
        50                  55                  60

Pro Cys Lys Ser Leu Arg Pro Glu Lys Ile Pro Asn His Val Phe Glu
65                  70                  75                  80

Ile Asp Glu Asp Cys Glu Lys Asp Glu Asp Ser Ser Ser Leu Cys Ser
                85                  90                  95

Gln Lys Gly Gly Val Ile Lys Gln Gly Trp Leu His Lys Ala Asn Val
            100                 105                 110

Asn Ser Thr Ile Thr Val Thr Met Lys Val Phe Lys Arg Arg Tyr Phe
            115                 120                 125

Tyr Leu Thr Gln Leu Pro Asp Gly Ser Tyr Ile Leu Asn Ser Tyr Lys
            130                 135                 140

Asp Glu Lys Asn Ser Lys Glu Ser Lys Gly Cys Ile Tyr Leu Asp Ala
145                 150                 155                 160

Cys Ile Asp Val Val Gln Cys Pro Lys Met Arg Arg His Ala Phe Glu
                165                 170                 175

Leu Lys Met Leu Asp Lys Tyr Ser His Tyr Leu Ala Ala Glu Thr Glu
            180                 185                 190

Gln Glu Met Glu Glu Trp Leu Ile Thr Leu Lys Lys Ile Ile Gln Ile
            195                 200                 205

Asn Thr Asp Ser Leu Val Gln Glu Lys Lys Glu Thr Val Glu Thr Ala
            210                 215                 220

Gln Asp Asp Glu Thr Ser Ser Gln Gly Lys Ala Glu Asn Ile Met Ala
225                 230                 235                 240
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Phe Ser Phe Asp Ser Glu Val Gln Arg Leu Asp Phe Ser Gly Ile Glu
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Pro Asp Ile Lys Pro Phe Glu Glu Lys Cys Asn Lys Arg Phe Leu Val
        290   295   300

Asn Cys His Asp Leu Thr Phe Asn Ile Leu Gly Gln Ile Gly Asp Asn
305   310   315   320

Ala Lys Gly Pro Pro Thr Asn Val Glu Pro Phe Phe Ile Asn Leu Ala
                325   330   335

Leu Phe Asp Val Lys Asn Asn Cys Lys Ile Ser Ala Asp Phe His Val
            340   345   350

Asp Leu Asn Pro Pro Ser Val Arg Glu Met Leu Trp Gly Ser Ser Thr
            355   360   365

Gln Leu Ala Ser Asp Gly Ser Pro Lys Gly Ser Ser Pro Glu Ser Tyr
    370   375   380

Ile His Gly Ile Ala Glu Ser Gln Leu Arg Tyr Ile Gln Gln Gly Ile
385   390   395   400

Phe Ser Val Thr Asn Pro His Pro Glu Ile Phe Leu Val Ala Arg Ile
            405   410   415

Glu Lys Val Leu Gln Gly Asn Ile Thr His Cys Ala Glu Pro Tyr Ile
            420   425   430

Lys Asn Ser Asp Pro Val Lys Thr Ala Gln Lys Val His Arg Thr Ala
            435   440   445

Lys Gln Val Cys Ser Arg Leu Gly Gln Tyr Arg Met Pro Phe Ala Trp
    450   455   460

Ala Ala Arg Pro Ile Phe Lys Asp Thr Gln Gly Ser Leu Asp Leu Asp
465   470   475   480

Gly Arg Phe Ser Pro Leu Tyr Lys Gln Asp Ser Ser Lys Leu Ser Ser
                485   490   495

Glu Asp Ile Leu Lys Leu Leu Ser Glu Tyr Lys Lys Pro Glu Lys Thr
            500   505   510

Lys Leu Gln Ile Ile Pro Gly Gln Leu Asn Ile Thr Val Glu Cys Val
        515   520   525

Pro Val Asp Leu Ser Asn Cys Ile Thr Ser Ser Tyr Val Pro Leu Lys
        530   535   540

Pro Phe Glu Lys Asn Cys Gln Asn Ile Thr Val Glu Val Glu Glu Phe
545   550   555   560

Phe Ala Lys Ala Arg Asn Ile Ala Val Cys Val Glu Phe Arg Asp Ser
        595   600   605

Asp Glu Ser Asp Ala Ser Ala Leu Lys Cys Ile Tyr Gly Lys Pro Ala
    610   615   620

Gly Ser Val Phe Thr Thr Asn Ala Tyr Ala Val Val Ser His His Asn
625   630   635   640

Gln Asn Pro Glu Phe Tyr Asp Glu Ile Lys Ile Glu Leu Pro Ile His
                645   650   655

Leu His Gln Lys His His Leu Leu Phe Thr Phe Tyr His Val Ser Cys
            660   665   670

Glu Ile Asn Thr Lys Gly Thr Thr Lys Lys Gln Asp Thr Val Glu Thr
            675   680   685

Pro Val Gly Phe Ala Trp Val Pro Leu Leu Lys Asp Gly Arg Ile Ile
    690   695   700

Thr Phe Glu Gln Gln Leu Pro Val Ser Ala Asn Leu Pro Pro Gly Tyr
705   710   715   720

Leu Asn Leu Asn Asp Ala Glu Ser Arg Arg Gln Cys Asn Val Asp Ile
            725   730   735

Lys Trp Val Asp Gly Ala Lys Pro Leu Leu Lys Phe Lys Ser His Leu
            740   745   750

Glu Ser Thr Ile Tyr Thr Gln Asp Leu His Val His Lys Phe Phe His
        755   760   765

His Cys Gln Leu Ile Gln Ser Gly Ser Lys Glu Val Pro Gly Glu Leu
    770   775   780

Ile Lys Tyr Leu Lys Cys Leu His Ala Met Glu Ile Gln Val Met Ile
785   790   795   800

Gln Phe Leu Pro Val Ile Leu Met Gln Leu Phe Arg Val Leu Thr Asn
            805   810   815

Met Thr His Glu Asp Asp Val Pro Ile Asn Cys Thr Met Val Leu Leu
            820   825   830

His Ile Val Ser Lys Cys His Glu Glu Gly Leu Asp Ser Tyr Leu Arg
        835   840   845

Ser Phe Ile Lys Tyr Ser Phe Arg Pro Glu Lys Pro Ser Ala Pro Gln
    850   855   860

Ala Gln Leu Ile His Glu Thr Leu Ala Thr Thr Met Ile Ala Ile Leu
865   870   875   880

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Glu Glu Asn Lys Ile Lys Leu Pro Arg Gly Gln Arg Phe Pro Glu Thr
        915             920             925

Tyr His His Val Leu His Ser Leu Leu Leu Ala Ile Ile Pro His Val
        930             935             940

Thr Ile Arg Tyr Ala Glu Ile Pro Asp Glu Ser Arg Asn Val Asn Tyr
945             950             955             960

Ser Leu Ala Ser Phe Leu Lys Arg Cys Leu Thr Leu Met Asp Arg Gly
        965             970             975

Phe Ile Phe Asn Leu Ile Asn Asp Tyr Ile Ser Gly Phe Ser Pro Lys
        980             985             990

Asp Pro Lys Val Leu Ala Glu Tyr Lys Phe Glu Phe Leu Gln Thr Ile
        995             1000            1005

Cys Asn His Glu His Tyr Ile Pro Leu Asn Leu Pro Met Ala Phe Ala
    1010            1015            1020

Lys Pro Lys Leu Gln Arg Val Gln Asp Ser Asn Leu Glu Tyr Ser Leu
1025            1030            1035            1040

Ser Asp Glu Tyr Cys Lys His His Phe Leu Val Gly Leu Leu Leu Arg
            1045            1050            1055

Glu Thr Ser Ile Ala Leu Gln Asp Asn Tyr Glu Ile Arg Tyr Thr Ala
        1060            1065            1070

Ile Ser Val Ile Lys Asn Leu Leu Ile Lys His Ala Phe Asp Thr Arg
        1075            1080            1085

Tyr Gln His Lys Asn Gln Gln Ala Lys Ile Ala Gln Leu Tyr Leu Pro
    1090            1095            1100

Phe Val Gly Leu Leu Leu Glu Asn Ile Gln Arg Leu Ala Gly Arg Asp
1105            1110            1115            1120

Thr Leu Tyr Ser Cys Ala Ala Met Pro Asn Ser Ala Ser Arg Asp Glu
            1125            1130            1135

Phe Pro Cys Gly Phe Thr Ser Pro Ala Asn Arg Gly Ser Leu Ser Thr
        1140            1145            1150

Asp Lys Asp Thr Ala Tyr Gly Ser Phe Gln Asn Gly His Gly Ile Lys
        1155            1160            1165

Arg Glu Asp Ser Arg Gly Ser Leu Ile Pro Glu Gly Ala Thr Gly Phe
    1170            1175            1180

Pro Asp Gln Gly Asn Thr Gly Glu Asn Thr Arg Gln Ser Ser Thr Arg
1185            1190            1195            1200
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Leu Leu Thr Tyr Trp Asn Lys Val Ser Pro Gln Glu Leu Ile Asn Ile
          1235   1240   1245

Leu Ile Leu Leu Glu Val Cys Leu Phe His Phe Arg Tyr Met Gly Lys
     1250   1255   1260

Arg Asn Ile Ala Arg Val His Asp Ala Trp Leu Ser Lys His Phe Gly
1265   1270   1275   1280

Ile Asp Arg Lys Ser Gln Thr Met Pro Ala Leu Arg Asn Arg Ser Gly
          1285   1290   1295

Val Met Gln Ala Arg Leu Gln His Leu Ser Ser Leu Glu Ser Ser Phe
          1300   1305   1310

Thr Leu Asn His Ser Ser Thr Thr Thr Glu Ala Asp Ile Phe His Gln
          1315   1320   1325

Ala Leu Leu Glu Gly Asn Thr Ala Thr Glu Val Ser Leu Thr Val Leu
     1330   1335   1340

Asp Thr Ile Ser Phe Phe Thr Gln Cys Phe Lys Thr Gln Leu Leu Asn
1345   1350   1355   1360

Asn Asp Gly His Asn Pro Leu Met Lys Lys Val Phe Asp Ile His Leu
          1365   1370   1375

Ala Phe Leu Lys Asn Gly Gln Ser Glu Val Ser Leu Lys His Val Phe
          1380   1385   1390

Ala Ser Leu Arg Ala Phe Ile Ser Lys Phe Pro Ser Ala Phe Phe Lys
          1395   1400   1405

Gly Arg Val Asn Met Cys Ala Ala Phe Cys Tyr Glu Val Leu Lys Cys
     1410   1415   1420

Cys Thr Ser Lys Ile Ser Ser Thr Arg Asn Glu Ala Ser Ala Leu Leu
1425   1430   1435   1440

Tyr Leu Leu Met Arg Asn Asn Phe Glu Tyr Thr Lys Arg Lys Thr Phe
          1445   1450   1455

Leu Arg Thr His Leu Gln Ile Ile Ile Ala Val Ser Gln Leu Ile Ala
          1460   1465   1470

Asp Val Ala Leu Ser Gly Gly Ser Arg Phe Gln Glu Ser Leu Phe Ile
     1475   1480   1485

Ile Asn Asn Phe Ala Asn Ser Asp Arg Pro Met Lys Ala Thr Ala Phe
     1490   1495   1500

Pro Ala Glu Val Lys Asp Leu Thr Lys Arg Ile Arg Thr Val Leu Met
1505   1510   1515   1520

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Arg Lys Thr Trp Leu Asp Ser Met Ala Lys Ile His Val Lys Asn Gly
    1555                1560                1565

Asp Phe Ser Glu Ala Ala Met Cys Tyr Val His Val Ala Ala Leu Val
    1570                1575                1580

Ala Glu Phe Leu His Arg Lys Lys Leu Phe Pro Asn Gly Cys Ser Ala
1585                1590                1595                1600

Phe Lys Lys Ile Thr Pro Asn Ile Asp Glu Glu Gly Ala Met Lys Glu
                1605                1610                1615

Asp Ala Gly Met Met Asp Val His Tyr Ser Glu Glu Val Leu Leu Glu
                1620                1625                1630

Leu Leu Glu Gln Cys Val Asp Gly Leu Trp Lys Ala Glu Arg Tyr Glu
    1635                1640                1645

Ile Ile Ser Glu Ile Ser Lys Leu Ile Val Pro Ile Tyr Glu Lys Arg
    1650                1655                1660

Arg Glu Phe Glu Lys Leu Thr Gln Val Tyr Arg Thr Leu His Gly Ala
1665                1670                1675                1680

Tyr Thr Lys Ile Leu Glu Val Met His Thr Lys Lys Arg Leu Leu Gly
                1685                1690                1695

Thr Phe Phe Arg Val Ala Phe Tyr Gly Gln Ser Phe Phe Glu Glu Glu
                1700                1705                1710

Asp Gly Lys Glu Tyr Ile Tyr Lys Glu Pro Lys Leu Thr Gly Leu Ser
    1715                1720                1725

Glu Ile Ser Leu Arg Leu Val Lys Leu Tyr Gly Glu Lys Phe Gly Thr
    1730                1735                1740

Glu Asn Val Lys Ile Ile Gln Asp Ser Asp Lys Val Asn Ala Lys Glu
1745                1750                1755                1760

Leu Asp Pro Lys Tyr Ala His Ile Gln Val Thr Tyr Val Lys Pro Tyr
                1765                1770                1775

Phe Asp Asp Lys Glu Leu Thr Glu Arg Lys Thr Glu Phe Glu Arg Asn
                1780                1785                1790

His Asn Ile Ser Arg Phe Val Phe Glu Ala Pro Tyr Thr Leu Ser Gly
    1795                1800                1805

Lys Lys Gln Gly Cys Ile Glu Glu Gln Cys Lys Arg Arg Thr Ile Leu
    1810                1815                1820

Thr Thr Ser Asn Ser Phe Pro Tyr Val Lys Lys Arg Ile Pro Ile Asn
1825                1830                1835                1840
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Val Asp Met Ile Gln Leu Gln Leu Lys Leu Gln Gly Trp Val Ser Val
    1875   1880   1885

Gln Val Asn Ala Gly Pro Leu Ala Tyr Ala Arg Ala Phe Leu Asn Asp
    1890   1895   1900

Ser Gln Ala Ser Lys Tyr Pro Pro Lys Lys Val Ser Glu Leu Lys Asp
1905   1910   1915   1920

Met Phe Arg Lys Phe Ile Gln Ala Cys Ser Ile Ala Leu Glu Leu Asn
              1925   1930   1935

Glu Arg Leu Ile Lys Glu Asp Gln Val Glu Tyr His Glu Gly Leu Lys
              1940   1945   1950

Ser Asn Phe Arg Asp Met Val Lys Glu Leu Ser Asp Ile Ile His Glu
    1955   1960   1965

Gln Ile Leu Gln Glu Asp Thr Met His Ser Pro Trp Met Ser Asn Thr
    1970   1975   1980

Leu His Val Phe Cys Ala Ile Ser Gly Thr Ser Ser Asp Arg Gly Tyr
1985   1990   1995   2000

Gly Ser Pro Arg Tyr Ala Glu Val
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Arg Thr Leu Gln Pro Ser Leu Pro Glu Glu Gly Val Glu Leu Asp Pro
              35   40   45

His Val Arg Asp Cys Val Gln Thr Tyr Ile Arg Glu Trp Leu Ile Val
    50   55   60

Asn Arg Lys Asn Gln Gly Ser Pro Glu Ile Cys Gly Phe Lys Lys Thr
    65   70   75   80

Gly Ser Arg Lys Asp Phe His Lys Thr Leu Pro Lys Gln Thr Phe Glu
              85   90   95

Cys Asp Phe Asp Leu Arg Ser Leu Gln Pro Asp Lys Arg Leu Glu Asn
    130   135   140

Leu Leu Gln Gln Val Ser Ala Glu Asp Phe Glu Lys Gln Asn Glu Glu
145   150   155   160

Ala Arg Arg Thr Asn Arg Gln Ala Glu Leu Phe Ala Leu Tyr Pro Ser
            165   170   175

Val Asp Glu Glu Asp Ala Val Glu Ile Arg Pro Val Pro Glu Cys Pro
          180   185   190

Lys Glu His Leu Gly Asn Arg Ile Leu Val Lys Leu Leu Thr Leu Lys
       195   200   205

Phe Glu Ile Glu Ile Glu Pro Leu Phe Ala Ser Ile Ala Leu Tyr Asp
     210   215   220

Val Lys Glu Arg Lys Lys Ile Ser Glu Asn Phe His Cys Asp Leu Asn
225   230   235   240

Ser Asp Gln Phe Lys Gly Phe Leu Arg Ala His Thr Pro Ser Val Ala
          245   250   255

Ala Ser Ser Gln Ala Arg Ser Ala Val Phe Ser Val Thr Tyr Pro Ser
          260   265   270

Ser Asp Ile Tyr Leu Val Val Lys Ile Glu Lys Val Leu Gln Gln Gly
          275   280   285

Asp Ile Gly Asp Cys Ala Glu Pro Tyr Thr Val Ile Lys Glu Ser Asp
     290   295   300

Gly Gly Lys Ser Lys Glu Lys Ile Glu Lys Leu Lys Leu Gln Ala Glu
305   310   315   320

Ser Phe Cys Gln Arg Leu Gly Lys Tyr Arg Met Pro Phe Ala Trp Ala
          325   330   335

Pro Ile Ser Leu Ser Ser Phe Phe Asn Val Ser Thr Leu Glu Arg Glu
          340   345   350

Val Thr Asp Val Asp Ser Val Val Gly Arg Ser Pro Val Gly Glu Arg
          355   360   365

Arg Thr Leu Ala Gln Ser Arg Arg Leu Ser Glu Arg Ala Leu Ser Leu
     370   375   380

Glu Glu Asn Gly Val Gly Ser Asn Phe Lys Thr Ser Thr Leu Ser Val
385   390   395   400

Ser Ser Phe Phe Lys Gln Glu Gly Asp Arg Leu Ser Asp Glu Asp Leu
          405   410   415

Glu Ile Ile Asn Cys Cys Leu Thr Pro Glu Met Leu Pro Val Lys Pro
450   455   460

Phe Pro Glu Asn Arg Thr Arg Pro His Lys Glu Ile Leu Glu Phe Pro
465   470   475   480

Thr Arg Glu Val Tyr Val Pro His Thr Val Tyr Arg Asn Leu Leu Tyr
            485   490   495

Val Tyr Pro Gln Arg Leu Asn Phe Val Asn Lys Leu Ala Ser Ala Arg
            500   505   510

Asn Ile Thr Ile Lys Ile Gln Phe Met Cys Gly Glu Asp Ala Ser Asn
            515   520   525

Ala Met Pro Val Ile Phe Gly Lys Ser Ser Gly Pro Glu Phe Leu Gln
    530   535   540

Glu Val Tyr Thr Ala Val Thr Tyr His Asn Lys Ser Pro Asp Phe Tyr
545   550   555   560

Glu Glu Val Lys Ile Lys Leu Pro Ala Lys Leu Thr Val Asn His His
            565   570   575

Leu Leu Phe Thr Phe Tyr His Ile Ser Cys Gln Gln Lys Gln Gly Ala
            580   585   590

Ser Val Glu Thr Leu Leu Gly Tyr Ser Trp Leu Pro Ile Leu Leu Asn
    595   600   605

Glu Arg Leu Gln Thr Gly Ser Tyr Cys Leu Pro Val Ala Leu Glu Lys
    610   615   620

Leu Pro Pro Asn Tyr Ser Met His Ser Ala Glu Lys Val Pro Leu Gln
625   630   635   640

Asn Pro Pro Ile Lys Trp Ala Glu Gly His Lys Gly Val Phe Asn Ile
            645   650   655

Glu Val Gln Ala Val Ser Ser Val His Thr Gln Asp Asn His Leu Glu
            660   665   670

Lys Phe Phe Thr Leu Cys His Ser Leu Glu Ser Gln Val Thr Phe Pro
            675   680   685

Ile Arg Val Leu Asp Gln Lys Ile Ser Glu Met Ala Leu Glu His Glu
690   695   700

Leu Lys Leu Ser Ile Ile Cys Leu Asn Ser Ser Arg Leu Glu Pro Leu
705   710   715   720

Val Leu Phe Leu His Leu Val Leu Asp Lys Leu Phe Gln Leu Ser Val
            725   730   735

Leu Ser Lys Asp Gln His Gly Arg Asn Cys Leu Leu Ala Ser Tyr Val
770   775   780

His Tyr Val Phe Arg Leu Pro Glu Val Gln Arg Asp Val Pro Lys Ser
785   790   795   800

Gly Ala Pro Thr Ala Leu Leu Asp Pro Arg Ser Tyr His Thr Tyr Gly
                805   810   815

Arg Thr Ser Ala Ala Ala Val Ser Ser Lys Leu Leu Gln Ala Arg Val
            820   825   830

Met Ser Ser Ser Asn Pro Asp Leu Ala Gly Thr His Ser Ala Ala Asp
        835   840   845

Glu Glu Val Lys Asn Ile Met Ser Ser Lys Ile Ala Asp Arg Asn Cys
    850   855   860

Ser Arg Met Ser Tyr Tyr Cys Ser Gly Ser Ser Asp Ala Pro Ser Ser
865   870   875   880

Pro Ala Ala Pro Arg Pro Ala Ser Lys Lys His Phe His Glu Glu Leu
                885   890   895

Ala Leu Gln Met Val Val Ser Thr Gly Met Val Lys Ser Met Ala Gln
            900   905   910

His Val His Asn Met Asp Lys Arg Asp Ser Phe Arg Arg Thr Arg Phe
            915   920   925

Ser Asp Arg Phe Met Asp Asp Ile Thr Thr Ile Val Asn Val Val Thr
    930   935   940

Ser Glu Ile Ala Ala Leu Leu Val Lys Pro Gln Lys Glu Asn Glu Gln
945   950   955   960

Ala Glu Lys Met Asn Ile Ser Leu Ala Phe Phe Leu Tyr Asp Leu Leu
            965   970   975

Ser Leu Met Asp Arg Gly Phe Val Phe Asn Leu Ile Arg His Tyr Cys
        980   985   990

Ser Gln Leu Ser Ala Lys Leu Ser Asn Leu Pro Thr Leu Ile Ser Met
    995   1000   1005

Arg Leu Glu Phe Leu Arg Ile Leu Cys Ser His Glu His Tyr Leu Asn
    1010   1015   1020

Leu Asn Leu Phe Phe Met Asn Ala Asp Thr Ala Pro Thr Ser Pro Cys
1025   1030   1035   1040

Pro Ser Ile Ser Ser Gln Asn Ser Ser Ser Cys Ser Ser Phe Gln Asp
            1045   1050   1055

Ala Glu Gly Glu Gly Ile Ser Lys Val Gln Arg Lys Ala Val Ser Ala
  1090   1095   1100

Ile His Ser Leu Leu Ser Ser His Asp Leu Asp Pro Arg Cys Val Lys
1105   1110   1115   1120

Pro Glu Val Lys Val Lys Ile Ala Ala Leu Tyr Leu Pro Leu Val Gly
         1125   1130   1135

Ile Ile Leu Asp Ala Leu Pro Gln Leu Cys Asp Phe Thr Val Ala Asp
         1140   1145   1150

Thr Arg Arg Tyr Arg Thr Ser Gly Ser Asp Glu Glu Gln Glu Gly Ala
         1155   1160   1165

Gly Ala Ile Asn Gln Asn Val Ala Leu Ala Ile Ala Gly Asn Asn Phe
        1170   1175   1180

Asn Leu Lys Thr Ser Gly Ile Val Leu Ser Ser Leu Pro Tyr Lys Gln
1185   1190   1195   1200

Tyr Asn Met Leu Asn Ala Asp Thr Thr Arg Asn Leu Met Ile Cys Phe
         1205   1210   1215

Leu Trp Ile Met Lys Asn Ala Asp Gln Ser Leu Ile Arg Lys Trp Ile
        1220   1225   1230

Ala Asp Leu Pro Ser Thr Gln Leu Asn Arg Ile Leu Asp Leu Leu Phe
        1235   1240   1245

Ile Cys Val Leu Cys Phe Glu Tyr Lys Gly Lys Gln Ser Ser Asp Lys
        1250   1255   1260

Val Ser Thr Gln Val Leu Gln Lys Ser Arg Asp Val Lys Ala Arg Leu
1265   1270   1275   1280

Glu Glu Ala Leu Leu Arg Gly Glu Gly Ala Arg Gly Glu Met Met Arg
        1285   1290   1295

Arg Arg Ala Pro Gly Asn Asp Arg Phe Pro Gly Leu Asn Glu Asn Leu
        1300   1305   1310

Arg Trp Lys Lys Glu Gln Thr His Trp Arg Gln Ala Asn Glu Lys Leu
        1315   1320   1325

Asp Lys Thr Lys Ala Glu Leu Asp Gln Glu Ala Leu Ile Ser Gly Asn
        1330   1335   1340

Leu Ala Thr Glu Ala His Leu Ile Ile Leu Asp Met Gln Glu Asn Ile
1345   1350   1355   1360

Ile Gln Ala Ser Ser Ala Leu Asp Cys Lys Asp Ser Leu Leu Gly Gly
        1365   1370   1375

Gly Asp Leu Leu Phe Glu Glu Glu Val Glu Gln Cys Phe Asp Leu Cys
   1410   1415   1420

His Gln Val Leu His His Cys Ser Ser Ser Met Asp Val Thr Arg Ser
1425   1430   1435   1440

Gln Ala Cys Ala Thr Leu Tyr Leu Leu Met Arg Phe Ser Phe Gly Ala
        1445   1450   1455

Thr Ser Asn Phe Ala Arg Val Lys Met Gln Val Thr Met Ser Leu Ala
       1460   1465   1470

Ser Leu Val Gly Arg Ala Pro Asp Phe Asn Glu Glu His Leu Arg Arg
      1475   1480   1485

Ser Leu Arg Thr Ile Leu Ala Tyr Ser Glu Glu Asp Thr Ala Met Gln
     1490   1495   1500

Met Thr Pro Phe Pro Thr Gln Val Glu Glu Leu Leu Cys Asn Leu Asn
1505   1510   1515   1520

Ser Ile Leu Tyr Asp Thr Val Lys Met Arg Glu Phe Gln Glu Asp Pro
        1525   1530   1535

Glu Met Leu Met Asp Leu Met Tyr Arg Ile Ala Lys Ser Tyr Gln Ala
       1540   1545   1550

Ser Pro Asp Leu Arg Leu Thr Trp Leu Gln Asn Met Ala Glu Lys His
      1555   1560   1565

Thr Lys Lys Lys Cys Tyr Thr Glu Ala Ala Met Cys Leu Val His Ala
   1570   1575   1580

Ala Ala Leu Val Ala Glu Tyr Leu Ser Met Leu Glu Asp His Ser Tyr
1585   1590   1595   1600

Leu Pro Val Gly Ser Val Ser Phe Gln Asn Ile Ser Ser Asn Val Leu
        1605   1610   1615

Glu Glu Ser Val Val Ser Glu Asp Thr Leu Ser Pro Asp Glu Asp Gly
       1620   1625   1630

Val Cys Ala Gly Gln Tyr Phe Thr Glu Ser Gly Leu Val Gly Leu Leu
      1635   1640   1645

Glu Gln Ala Ala Glu Leu Phe Ser Thr Gly Gly Leu Tyr Glu Thr Val
   1650   1655   1660

Asn Glu Val Tyr Lys Leu Val Ile Pro Ile Leu Glu Ala His Arg Glu
1665   1670   1675   1680

Phe Arg Lys Leu Thr Leu Thr His Ser Lys Leu Gln Arg Ala Phe Asp
        1685   1690   1695

Val Tyr Lys Glu Pro Ala Ile Thr Lys Leu Pro Glu Ile Ser His Arg
  1730   1735   1740

Leu Glu Ala Phe Tyr Gly Gln Cys Phe Gly Ala Glu Phe Val Glu Val
1745   1750   1755   1760

Ile Lys Asp Ser Thr Pro Val Asp Lys Thr Lys Leu Asp Pro Asn Lys
          1765   1770   1775

Ala Tyr Ile Gln Ile Thr Phe Val Glu Pro Tyr Phe Asp Glu Tyr Glu
          1780   1785   1790

Met Lys Asp Arg Val Thr Tyr Phe Glu Lys Asn Phe Asn Leu Arg Arg
      1795   1800   1805

Phe Met Tyr Thr Thr Pro Phe Thr Leu Glu Gly Arg Pro Arg Gly Glu
      1810   1815   1820

Leu His Glu Gln Tyr Arg Arg Asn Thr Val Leu Thr Thr Met His Ala
1825   1830   1835   1840

Phe Pro Tyr Ile Lys Thr Arg Ile Ser Val Ile Gln Lys Glu Glu Phe
          1845   1850   1855

Val Leu Thr Pro Ile Glu Val Ala Ile Glu Asp Met Lys Lys Lys Thr
      1860   1865   1870

Leu Gln Leu Ala Val Ala Ile Asn Gln Glu Pro Pro Asp Ala Lys Met
      1875   1880   1885

Leu Gln Met Val Leu Gln Gly Ser Val Gly Ala Thr Val Asn Gln Gly
      1890   1895   1900

Pro Leu Glu Val Ala Gln Val Phe Leu Ala Glu Ile Pro Ala Asp Pro
1905   1910   1915   1920

Lys Leu Tyr Arg His His Asn Lys Leu Arg Leu Cys Phe Lys Glu Phe
          1925   1930   1935

Ile Met Arg Cys Gly Glu Ala Val Glu Lys Asn Lys Arg Leu Ile Thr
      1940   1945   1950

Ala Asp Gln Arg Glu Tyr Gln Gln Glu Leu Lys Lys Asn Tyr Asn Lys
      1955   1960   1965

Leu Lys Glu Asn Leu Arg Pro Met Ile Glu Arg Lys Ile Pro Glu Leu
      1970   1975   1980

Tyr Lys Pro Ile Phe Arg Val Glu Ser Gln Lys Arg Asp Ser Phe His
1985   1990   1995   2000

Arg Ser Ser Phe Arg Lys Cys Glu Thr Gln Leu Ser Gln Gly Ser
      2005   2010   2015

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Ala Glu Val Arg Lys Gln Ile Ser Gly Gln Tyr Ser Gly Ser Pro Gln
                20   25   30

Leu Leu Lys Asn Leu Asn Ile Val Gly Asn Ile Ser His His Thr Thr
            35   40   45

Val Pro Leu Thr Glu Ala Val Asp Pro Val Asp Leu Glu Asp Tyr Leu
        50   55   60

Ile Thr His Pro Leu Ala Val Asp Ser Gly Pro Leu Arg Asp Leu Ile
65   70   75   80

Glu Phe Pro Pro Asp Asp Ile Glu Val Val Tyr Ser Pro Arg Asp Cys
                85   90   95

Arg Thr Leu Val Ser Ala Val Pro Glu Glu Ser Glu Met Asp Pro His
            100   105   110

Val Arg Asp Cys Ile Arg Ser Tyr Thr Glu Asp Trp Ala Ile Val Ile
        115   120   125

Arg Lys Tyr His Lys Leu Gly Thr Gly Phe Asn Pro Asn Thr Leu Asp
    130   135   140

Lys Gln Lys Glu Arg Gln Lys Gly Leu Pro Lys Gln Val Phe Glu Ser
145   150   155   160

Asp Glu Ala Pro Asp Gly Asn Ser Tyr Gln Asp Asp Gln Asp Asp Leu
                165   170   175

Lys Arg Arg Ser Met Ser Ile Asp Asp Thr Pro Arg Gly Ser Trp Ala
            180   185   190

Cys Ser Ile Phe Asp Leu Lys Asn Ser Leu Pro Asp Ala Leu Leu Pro
        195   200   205

Asn Leu Leu Asp Arg Thr Pro Asn Glu Glu Ile Asp Arg Gln Asn Asp
    210   215   220

Asp Gln Arg Lys Ser Asn Arg His Lys Glu Leu Phe Ala Leu His Pro
225   230   235   240

Ser Pro Asp Glu Glu Glu Pro Ile Glu Arg Leu Ser Val Pro Asp Ile
                245   250   255

Pro Lys Glu His Phe Gly Gln Arg Leu Leu Val Lys Cys Leu Ser Leu
            260   265   270

Asn Ser Glu Gln Met Lys Gly Leu Leu Arg Pro His Val Pro Pro Ala
305   310   315   320

Ala Ile Thr Thr Leu Ala Arg Ser Ala Ile Phe Ser Ile Thr Tyr Pro
                325   330   335

Ser Gln Asp Val Phe Leu Val Ile Lys Leu Glu Lys Val Leu Gln Gln
                340   345   350

Gly Asp Ile Gly Glu Cys Ala Glu Pro Tyr Met Ile Phe Lys Glu Ala
                355   360   365

Asp Ala Thr Lys Asn Lys Glu Lys Leu Glu Lys Leu Lys Ser Gln Ala
        370   375   380

Asp Gln Phe Cys Gln Arg Leu Gly Lys Tyr Arg Met Pro Phe Ala Trp
385   390   395   400

Thr Ala Ile His Leu Met Asn Ile Val Ser Ser Ala Gly Ser Leu Glu
                405   410   415

Arg Asp Ser Thr Glu Val Glu Ile Ser Thr Gly Glu Arg Lys Gly Ser
                420   425   430

Trp Ser Glu Arg Arg Asn Ser Ser Ile Val Gly Arg Arg Ser Leu Glu
                435   440   445

Arg Thr Thr Ser Gly Asp Asp Ala Cys Asn Leu Thr Ser Phe Arg Pro
    450   455   460

Ala Thr Leu Thr Val Thr Asn Phe Phe Lys Gln Glu Gly Asp Arg Leu
465   470   475   480

Ser Asp Glu Asp Leu Tyr Lys Phe Leu Ala Asp Met Arg Arg Pro Ser
                485   490   495

Ser Val Leu Arg Arg Leu Arg Pro Ile Thr Ala Gln Leu Lys Ile Asp
                500   505   510

Ile Ser Pro Ala Pro Glu Asn Pro His Tyr Cys Leu Thr Pro Glu Leu
                515   520   525

Leu Gln Val Lys Leu Tyr Pro Asp Ser Arg Val Arg Pro Thr Arg Glu
    530   535   540

Ile Leu Glu Phe Pro Ala Arg Asp Val Tyr Val Pro Asn Thr Thr Tyr
545   550   555   560

Arg Asn Leu Leu Tyr Ile Tyr Pro Gln Ser Leu Asn Phe Ala Asn Arg
                565   570   575

Gln Gly Ser Ala Arg Asn Ile Thr Val Lys Val Gln Phe Met Tyr Gly
                580   585   590

Ser Pro Asp Phe His Glu Glu Ile Lys Val Lys Leu Pro Ala Thr Leu
625   630   635   640

Thr Asp His His His Leu Leu Phe Thr Phe Tyr His Val Ser Cys Gln
                    645   650   655

Gln Lys Gln Asn Thr Pro Leu Glu Thr Pro Val Gly Tyr Thr Trp Ile
            660   665   670

Pro Met Leu Gln Asn Gly Arg Leu Lys Thr Gly Gln Phe Cys Leu Pro
            675   680   685

Val Ser Leu Glu Lys Pro Pro Gln Ala Tyr Ser Val Leu Ser Pro Glu
            690   695   700

Val Pro Leu Pro Gly Met Lys Trp Val Asp Asn His Lys Gly Val Phe
705   710   715   720

Asn Val Glu Val Val Ala Val Ser Ser Ile His Thr Gln Asp Pro Tyr
                    725   730   735

Leu Asp Lys Phe Phe Ala Leu Val Asn Ala Leu Asp Glu His Leu Phe
            740   745   750

Pro Val Arg Ile Gly Asp Met Arg Ile Met Glu Asn Asn Leu Glu Asn
            755   760   765

Glu Leu Lys Ser Ser Ile Ser Ala Leu Asn Ser Ser Gln Leu Glu Pro
    770   775   780

Val Val Arg Phe Leu His Leu Leu Leu Asp Lys Leu Ile Leu Leu Val
785   790   795   800

Ile Arg Pro Pro Val Ile Ala Gly Gln Ile Val Asn Leu Gly Gln Ala
            805   810   815

Ser Phe Glu Ala Met Ala Ser Ile Ile Asn Arg Leu His Lys Asn Leu
            820   825   830

Glu Gly Asn His Asp Gln His Gly Arg Asn Ser Leu Leu Ala Ser Tyr
            835   840   845

Ile His Tyr Val Phe Arg Leu Pro Asn Thr Tyr Pro Asn Ser Ser Ser
    850   855   860

Pro Gly Pro Gly Gly Leu Gly Gly Ser Val His Tyr Ala Thr Met Ala
865   870   875   880

Arg Ser Ala Val Arg Pro Ala Ser Leu Asn Leu Asn Arg Ser Arg Ser
            885   890   895

Leu Ser Asn Ser Asn Pro Asp Ile Ser Gly Thr Pro Thr Ser Pro Asp
            900   905   910

Pro Ser Pro Ser Ala Glu Ser Thr Gln Ala Met Asp Arg Ser Cys Asn
945   950   955   960

Arg Met Ser Ser His Thr Glu Thr Ser Ser Phe Leu Gln Thr Leu Thr
               965   970   975

Gly Arg Leu Pro Thr Lys Lys Leu Phe His Glu Glu Leu Ala Leu Gln
           980   985   990

Trp Val Val Cys Ser Gly Ser Val Arg Glu Ser Ala Leu Gln Gln Ala
           995   1000   1005

Trp Phe Phe Phe Glu Leu Met Val Lys Ser Met Val His His Leu Tyr
       1010   1015   1020

Phe Asn Asp Lys Leu Glu Ala Pro Arg Lys Ser Arg Phe Pro Glu Arg
1025   1030   1035   1040

Phe Met Asp Asp Ile Ala Ala Leu Val Ser Thr Ile Ala Ser Asp Ile
           1045   1050   1055

Val Ser Arg Phe Gln Lys Asp Thr Glu Met Val Glu Arg Leu Asn Thr
           1060   1065   1070

Ser Leu Ala Phe Phe Leu Asn Asp Leu Leu Ser Val Met Asp Arg Gly
       1075   1080   1085

Phe Val Phe Ser Leu Ile Lys Ser Cys Tyr Lys Gln Val Ser Ser Lys
       1090   1095   1100

Leu Tyr Ser Leu Pro Asn Pro Ser Val Leu Val Ser Leu Arg Leu Asp
1105   1110   1115   1120

Phe Leu Arg Ile Ile Cys Ser His Glu His Tyr Val Thr Leu Asn Leu
           1125   1130   1135

Pro Cys Ser Leu Leu Thr Pro Pro Ala Ser Pro Ser Pro Ser Val Ser
           1140   1145   1150

Ser Ala Thr Ser Gln Ser Ser Gly Phe Ser Thr Asn Val Gln Asp Gln
       1155   1160   1165

Lys Ile Ala Asn Met Phe Glu Leu Ser Val Pro Phe Arg Gln Gln His
   1170   1175   1180

Tyr Leu Ala Gly Leu Val Leu Thr Glu Leu Ala Val Ile Leu Asp Pro
1185   1190   1195   1200

Asp Ala Glu Gly Leu Phe Gly Leu His Lys Lys Val Ile Asn Met Val
           1205   1210   1215

His Asn Leu Leu Ser Ser His Asp Ser Asp Pro Arg Tyr Ser Asp Pro
       1220   1225   1230

Gln Arg Gly Arg Pro Ile Cys Ile Ala Thr Asp Asp Tyr Glu Ser Glu
1265   1270   1275   1280

Ser Gly Ser Met Ile Ser Gln Thr Val Ala Met Ala Ile Ala Gly Thr
                1285   1290   1295

Ser Val Pro Gln Leu Thr Arg Pro Gly Ser Phe Leu Leu Thr Ser Thr
            1300   1305   1310

Ser Gly Arg Gln His Thr Thr Phe Ser Ala Glu Ser Ser Arg Ser Leu
            1315   1320   1325

Leu Ile Cys Leu Leu Trp Val Leu Lys Asn Ala Asp Glu Thr Val Leu
        1330   1335   1340

Gln Lys Trp Phe Thr Asp Leu Ser Val Leu Gln Leu Asn Arg Leu Leu
1345   1350   1355   1360

Asp Leu Leu Tyr Leu Cys Val Ser Cys Phe Glu Tyr Lys Gly Lys Lys
            1365   1370   1375

Val Phe Glu Arg Met Asn Ser Leu Thr Phe Lys Lys Ser Lys Asp Met
            1380   1385   1390

Arg Ala Lys Leu Glu Glu Ala Ile Leu Gly Ser Ile Gly Ala Arg Gln
        1395   1400   1405

Glu Met Val Arg Arg Ser Arg Gly Gln Leu Glu Arg Ser Pro Ser Gly
    1410   1415   1420

Ser Ala Phe Gly Ser Gln Glu Asn Leu Arg Trp Arg Lys Asp Met Thr
1425   1430   1435   1440

His Trp Arg Gln Asn Thr Glu Lys Leu Asp Lys Ser Arg Ala Glu Ile
            1445   1450   1455

Glu His Glu Ala Leu Ile Asp Gly Asn Leu Ala Thr Glu Ala Asn Leu
        1460   1465   1470

Ile Ile Leu Asp Thr Leu Glu Ile Val Val Gln Thr Val Ser Val Thr
        1475   1480   1485

Glu Ser Lys Glu Ser Ile Leu Gly Gly Val Leu Lys Val Leu Leu His
    1490   1495   1500

Ser Met Ala Cys Asn Gln Ser Ala Val Tyr Leu Gln His Cys Phe Ala
1505   1510   1515   1520

Thr Gln Arg Ala Leu Val Ser Lys Phe Pro Glu Leu Leu Phe Glu Glu
            1525   1530   1535

Glu Thr Glu Gln Cys Ala Asp Leu Cys Leu Arg Leu Leu Arg His Cys
        1540   1545   1550

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Lys Met Gln Val Pro Met Ser Leu Ser Ser Leu Val Gly Thr Ser Gln
1585                1590                1595                1600

Asn Phe Asn Glu Glu Phe Leu Arg Arg Ser Leu Lys Thr Ile Leu Thr
                1605                1610                1615

Tyr Ala Glu Glu Asp Leu Glu Leu Arg Glu Thr Thr Phe Pro Asp Gln
                1620                1625                1630

Val Gln Asp Leu Val Phe Asn Leu His Met Ile Leu Ser Asp Thr Val
                1635                1640                1645

Lys Met Lys Glu His Gln Glu Asp Pro Glu Met Leu Ile Asp Leu Met
                1650                1655                1660

Tyr Arg Ile Ala Lys Gly Tyr Gln Thr Ser Pro Glu Arg Leu Thr Trp
1665                1670                1675                1680

Leu Gln Asn Met Ala Gly Lys His Ser Glu Arg Ser Asn His Ala Glu
                1685                1690                1695

Ala Ala Gln Cys Leu Val His Ser Ala Ala Leu Val Ala Glu Tyr Leu
                1700                1705                1710

Ser Met Leu Glu Asp Arg Lys Tyr Leu Pro Val Gly Cys Val Thr Phe
                1715                1720                1725

Gln Asn Ile Ser Ser Asn Val Leu Glu Glu Ser Ala Val Ser Asp Asp
                1730                1735                1740

Val Val Ser Pro Asp Glu Glu Gly Ile Cys Ser Gly Lys Tyr Phe Thr
1745                1750                1755                1760

Glu Ser Gly Leu Val Gly Leu Leu Glu Gln Ala Ala Ala Ser Phe Ser
                1765                1770                1775

Met Ala Gly Met Tyr Glu Ala Val Asn Glu Val Tyr Lys Val Leu Ile
                1780                1785                1790

Pro Ile His Glu Ala Asn Arg Asp Ala Lys Lys Leu Ser Thr Ile His
                1795                1800                1805

Gly Lys Leu Gln Glu Ala Phe Ser Lys Ile Val His Gln Ser Thr Gly
    1810                1815                1820

Trp Glu Arg Met Phe Gly Thr Tyr Phe Arg Val Gly Phe Tyr Gly Thr
1825                1830                1835                1840

Lys Phe Gly Asp Leu Asp Glu Gln Glu Phe Val Tyr Lys Glu Pro Ala
                1845                1850                1855

Ile Thr Lys Leu Ala Glu Ile Ser His Arg Leu Glu Gly Phe Tyr Gly
                1860                1865                1870
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Tyr Val Glu Pro Tyr Phe Asp Thr Tyr Glu Met Lys Asp Arg Ile Thr
1905   1910   1915   1920

Tyr Phe Asp Lys Asn Tyr Asn Leu Arg Arg Phe Met Tyr Cys Thr Pro
                1925   1930   1935

Phe Thr Leu Asp Gly Arg Ala His Gly Glu Leu His Glu Gln Phe Lys
                1940   1945   1950

Arg Lys Thr Ile Leu Thr Thr Ser His Ala Phe Pro Tyr Ile Lys Thr
            1955   1960   1965

Arg Val Asn Val Thr His Lys Glu Glu Ile Ile Leu Thr Pro Ile Glu
        1970   1975   1980

Val Ala Ile Glu Asp Met Gln Lys Lys Thr Gln Glu Leu Ala Phe Ala
1985   1990   1995   2000

Thr His Gln Asp Pro Ala Asp Pro Lys Met Leu Gln Met Val Leu Gln
                2005   2010   2015

Gly Ser Val Gly Thr Thr Val Asn Gln Gly Pro Leu Glu Val Ala Gln
            2020   2025   2030

Val Phe Leu Ser Glu Ile Pro Ser Asp Pro Lys Leu Phe Arg His His
            2035   2040   2045

Asn Lys Leu Arg Leu Cys Phe Lys Asp Phe Thr Lys Arg Cys Glu Asp
        2050   2055   2060

Ala Leu Arg Lys Asn Lys Ser Leu Ile Gly Pro Val Gln Lys Glu Tyr
2065   2070   2075   2080

Gln Arg Glu Leu Gly Lys Leu Ser Ser Pro
                2085   2090

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Gln Gly Arg Tyr Ile Cys Ser Thr Val Pro Ala Lys Ala Glu Glu Glu
            20   25   30

Ala Gln Ser Leu Phe Val Thr Glu Cys Ile Lys Thr Tyr Asn Ser Asp
            35   40   45

Tyr Glu Val Asp Glu Glu Val Asp Lys Asp Glu Asp Ala Ala Ser Leu
                85   90   95

Gly Ser Gln Lys Gly Gly Ile Thr Lys His Gly Trp Leu Tyr Lys Gly
                100   105   110

Asn Met Asn Ser Ala Ile Ser Val Thr Met Arg Ser Phe Lys Arg Arg
                115   120   125

Phe Phe His Leu Ile Gln Leu Gly Asp Gly Ser Tyr Asn Leu Asn Phe
        130   135   140

Tyr Lys Asp Glu Lys Ile Ser Lys Glu Pro Lys Gly Ser Ile Phe Leu
145   150   155   160

Asp Ser Cys Met Gly Val Val Gln Asn Asn Lys Val Arg Arg Phe Ala
                165   170   175

Phe Glu Leu Lys Met Gln Asp Lys Ser Ser Tyr Leu Leu Ala Ala Asp
                180   185   190

Ser Glu Val Glu Met Glu Glu Trp Ile Thr Ile Leu Asn Lys Ile Leu
                195   200   205

Gln Leu Asn Phe Glu Ala Ala Met Gln Glu Lys Arg Asn Gly Asp Ser
        210   215   220

His Glu Asp Asp Glu Gln Ser Lys Leu Glu Gly Ser Gly Ser Gly Leu
225   230   235   240

Asp Ser Tyr Leu Pro Glu Leu Ala Lys Ser Ala Arg Glu Ala Glu Ile
                245   250   255

Lys Leu Lys Ser Glu Ser Arg Val Lys Leu Phe Tyr Leu Asp Pro Asp
                260   265   270

Ala Gln Lys Leu Asp Phe Ser Ser Ala Glu Pro Glu Val Lys Ser Phe
                275   280   285

Glu Glu Lys Phe Gly Lys Arg Ile Leu Val Lys Cys Asn Asp Leu Ser
        290   295   300

Phe Asn Leu Gln Cys Cys Val Ala Glu Asn Glu Glu Gly Pro Thr Thr
305   310   315   320

Asn Val Glu Pro Phe Phe Val Thr Leu Ser Leu Phe Asp Ile Lys Tyr
                325   330   335

Asn Arg Lys Ile Ser Ala Asp Phe His Val Asp Leu Asn His Phe Ser
                340   345   350

Val Arg Gln Met Leu Ala Thr Thr Ser Pro Ala Leu Met Asn Gly Ser
                355   360   365

Ile Phe Leu Val Ala Arg Ile Glu Lys Val Leu Gln Gly Ser Ile Thr
            405   410   415

His Cys Ala Glu Pro Tyr Met Lys Ser Ser Asp Ser Ser Lys Val Ala
            420   425   430

Gln Lys Val Leu Lys Asn Ala Lys Gln Ala Cys Gln Arg Leu Gly Gln
            435   440   445

Tyr Arg Met Pro Phe Ala Trp Ala Ala Arg Thr Leu Phe Lys Asp Ala
    450   455   460

Ser Gly Asn Leu Asp Lys Asn Ala Arg Phe Ser Ala Ile Tyr Arg Gln
465   470   475   480

Asp Ser Asn Lys Leu Ser Asn Asp Asp Met Leu Lys Leu Leu Ala Asp
            485   490   495

Phe Arg Lys Pro Glu Lys Met Ala Lys Leu Pro Val Ile Leu Gly Asn
            500   505   510

Leu Asp Ile Thr Ile Asp Asn Val Ser Ser Asp Phe Pro Asn Tyr Val
            515   520   525

Asn Ser Ser Tyr Ile Pro Thr Lys Gln Phe Glu Thr Cys Ser Lys Thr
    530   535   540

Pro Ile Thr Phe Glu Val Glu Glu Phe Val Pro Cys Ile Pro Lys His
545   550   555   560

Thr Gln Pro Tyr Thr Ile Tyr Thr Asn His Leu Tyr Val Tyr Pro Lys
            565   570   575

Tyr Leu Lys Tyr Asp Ser Gln Lys Ser Phe Ala Lys Ala Arg Asn Ile
            580   585   590

Ala Ile Cys Ile Glu Phe Lys Asp Ser Asp Glu Glu Asp Ser Gln Pro
            595   600   605

Leu Lys Cys Ile Tyr Gly Arg Pro Gly Gly Pro Val Phe Thr Arg Ser
    610   615   620

Ala Phe Ala Ala Val Leu His His His Gln Asn Pro Glu Phe Tyr Asp
625   630   635   640

Glu Ile Lys Ile Glu Leu Pro Thr Gln Leu His Glu Lys His His Leu
            645   650   655

Leu Leu Thr Phe Phe His Val Ser Cys Asp Asn Ser Ser Lys Gly Ser
            660   665   670

Thr Lys Lys Arg Asp Val Val Glu Thr Gln Val Gly Tyr Ser Trp Leu
    675   680   685

Met Gly Arg His Tyr Gly Pro Glu Ile Lys Trp Val Asp Gly Gly Lys
725 730 735

Pro Leu Leu Lys Ile Ser Thr His Leu Val Ser Thr Val Tyr Thr Gln
740 745 750

Asp Gln His Leu His Asn Phe Phe Gln Tyr Cys Gln Lys Thr Glu Ser
755 760 765

Gly Ala Gln Ala Leu Gly Asn Glu Leu Val Lys Tyr Leu Lys Ser Leu
770 775 780

His Ala Met Glu Gly His Val Met Ile Ala Phe Leu Pro Thr Ile Leu
785 790 795 800

Asn Gln Leu Phe Arg Val Leu Thr Arg Ala Thr Gln Glu Glu Val Ala
805 810 815

Val Asn Val Thr Arg Val Ile Ile His Val Val Ala Gln Cys His Glu
820 825 830

Glu Gly Leu Glu Ser His Leu Arg Ser Tyr Val Lys Tyr Ala Tyr Lys
835 840 845

Ala Glu Pro Tyr Val Ala Ser Glu Tyr Lys Thr Val His Glu Glu Leu
850 855 860

Thr Lys Ser Met Thr Thr Ile Leu Lys Pro Ser Ala Asp Phe Leu Thr
865 870 875 880

Ser Asn Lys Leu Leu Arg Tyr Ser Trp Phe Phe Phe Asp Val Leu Ile
885 890 895

Lys Ser Met Ala Gln His Leu Ile Glu Asn Ser Lys Val Lys Leu Leu
900 905 910

Arg Asn Gln Arg Phe Pro Ala Ser Tyr His His Ala Ala Glu Thr Val
915 920 925

Val Asn Met Leu Met Pro His Ile Thr Gln Lys Phe Gly Asp Asn Pro
930 935 940

Glu Ala Ser Lys Asn Ala Asn His Ser Leu Ala Val Phe Ile Lys Arg
945 950 955 960

Cys Phe Thr Phe Met Asp Arg Gly Phe Val Phe Lys Gln Ile Asn Asn
965 970 975

Tyr Ile Ser Cys Phe Ala Pro Gly Asp Pro Lys Thr Leu Phe Glu Tyr
980 985 990

Lys Phe Glu Phe Leu Arg Val Val Cys Asn His Glu His Tyr Ile Pro
995 1000 1005

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Phe Leu Val Gly Leu Leu Leu Arg Glu Val Gly Thr Ala Leu Gln Glu
          1045                1050                1055

Phe Arg Glu Val Arg Leu Ile Ala Ile Ser Val Leu Lys Asn Leu Leu
          1060                1065                1070

Ile Lys His Ser Phe Asp Asp Arg Tyr Ala Ser Arg Ser His Gln Ala
          1075                1080                1085

Arg Ile Ala Thr Leu Tyr Leu Pro Leu Phe Gly Leu Leu Ile Glu Asn
       1090                1095                1100

Val Gln Arg Ile Asn Val Arg Asp Val Ser Pro Phe Pro Val Asn Ala
    1105                1110                1115                1120

Gly Met Thr Val Lys Asp Glu Ser Leu Ala Leu Pro Ala Val Asn Pro
          1125                1130                1135

Leu Val Thr Pro Gln Lys Gly Ser Thr Leu Asp Asn Ser Leu His Lys
          1140                1145                1150

Asp Leu Leu Gly Ala Ile Ser Gly Ile Ala Ser Pro Tyr Thr Thr Ser
          1155                1160                1165

Thr Pro Asn Ile Asn Ser Val Arg Asn Ala Asp Ser Arg Gly Ser Leu
       1170                1175                1180

Ile Ser Thr Asp Ser Gly Asn Ser Leu Pro Glu Arg Asn Ser Glu Lys
    1185                1190                1195                1200

Ser Asn Ser Leu Asp Lys His Gln Gln Ser Ser Thr Leu Gly Asn Ser
          1205                1210                1215

Val Val Arg Cys Asp Lys Leu Asp Gln Ser Glu Ile Lys Ser Leu Leu
          1220                1225                1230

Met Cys Phe Leu Tyr Ile Leu Lys Ser Met Ser Asp Asp Ala Leu Phe
          1235                1240                1245

Thr Tyr Trp Asn Lys Ala Ser Thr Ser Glu Leu Met Asp Phe Phe Thr
       1250                1255                1260

Ile Ser Glu Val Cys Leu His Gln Phe Gln Tyr Met Gly Lys Arg Tyr
    1265                1270                1275                1280

Ile Ala Arg Asn Gln Glu Gly Leu Gly Pro Ile Val His Asp Arg Lys
          1285                1290                1295

Ser Gln Thr Leu Pro Val Ser Arg Asn Arg Thr Gly Met Met His Ala
          1300                1305                1310

Arg Leu Gln Gln Leu Gly Ser Leu Asp Asn Ser Leu Thr Phe Asn His
          1315                1320                1325
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Leu Phe Thr Leu Ala Phe Lys Asn Gln Leu Leu Ala Asp His Gly His
          1365                1370                1375

Asn Pro Leu Met Lys Lys Val Phe Asp Val Tyr Leu Cys Phe Leu Gln
          1380                1385                1390

Lys His Gln Ser Glu Thr Ala Leu Lys Asn Val Phe Thr Ala Leu Arg
          1395                1400                1405

Ser Leu Ile Tyr Lys Phe Pro Ser Thr Phe Tyr Glu Gly Arg Ala Asp
          1410                1415                1420

Met Cys Ala Ala Leu Cys Tyr Glu Ile Leu Lys Cys Cys Asn Ser Lys
1425                1430                1435                1440

Leu Ser Ser Ile Arg Thr Glu Ala Ser Gln Leu Leu Tyr Phe Leu Met
          1445                1450                1455

Arg Asn Asn Phe Asp Tyr Thr Gly Lys Lys Ser Phe Val Arg Thr His
          1460                1465                1470

Leu Gln Val Ile Ile Ser Val Ser Gln Leu Ile Ala Asp Val Val Gly
          1475                1480                1485

Ile Gly Glu Thr Arg Phe Gln Gln Ser Leu Ser Ile Ile Asn Asn Cys
          1490                1495                1500

Ala Asn Ser Asp Arg Leu Ile Lys His Thr Ser Phe Ser Ser Asp Val
1505                1510                1515                1520

Lys Asp Leu Thr Lys Arg Ile Arg Thr Val Leu Met Ala Thr Ala Gln
          1525                1530                1535

Met Lys Glu His Glu Asn Asp Pro Glu Met Leu Val Asp Leu Gln Tyr
          1540                1545                1550

Ser Leu Ala Lys Ser Tyr Ala Ser Thr Pro Glu Leu Arg Lys Thr Trp
          1555                1560                1565

Leu Asp Ser Met Ala Arg Ile His Val Lys Asn Gly Asp Leu Ser Glu
          1570                1575                1580

Ala Ala Met Cys Tyr Val His Val Thr Ala Leu Val Ala Glu Tyr Leu
1585                1590                1595                1600

Thr Arg Lys Gly Val Phe Arg Gln Gly Cys Thr Ala Phe Arg Val Ile
          1605                1610                1615

Thr Pro Asn Ile Asp Glu Glu Ala Ser Met Met Glu Asp Val Gly Met
          1620                1625                1630

Gln Asp Val His Phe Asn Glu Asp Val Leu Met Glu Leu Leu Glu Gln
          1635                1640                1645
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Glu Asp Glu Asp Gly Lys Glu Tyr Ile Tyr Lys Glu Pro Lys Leu Thr
            1685                    1690                1695

Pro Leu Ser Glu Ile Ser Gln Arg Leu Leu Lys Leu Tyr Ser Asp Lys
            1700                1705                1710

Phe Gly Ser Glu Asn Val Lys Met Ile Gln Asp Ser Gly Lys Val Asn
            1715                1720                1725

Pro Lys Asp Leu Asp Ser Lys Tyr Ala Tyr Ile Gln Val Thr His Val
        1730                1735                1740

Ile Pro Phe Phe Asp Glu Lys Glu Leu Gln Glu Arg Lys Thr Glu Phe
1745                1750                1755                1760

Glu Arg Ser His Asn Ile Arg Arg Phe Met Phe Glu Met Pro Phe Thr
            1765                1770                1775

Gln Thr Gly Lys Arg Gln Gly Gly Val Glu Glu Gln Cys Lys Arg Arg
            1780                1785                1790

Thr Ile Leu Thr Ala Ile His Cys Phe Pro Tyr Val Lys Lys Arg Ile
            1795                1800                1805

Pro Val Met Tyr Gln His His Thr Asp Leu Asn Pro Ile Glu Val Ala
        1810                1815                1820

Ile Asp Glu Met Ser Lys Lys Val Ala Glu Leu Arg Gln Leu Cys Ser
1825                1930                1835                1840

Ser Ala Glu Val Asp Met Ile Lys Leu Gln Leu Lys Leu Gln Gly Ser
            1845                1850                1855

Val Ser Val Gln Val Asn Ala Gly Pro Leu Ala Tyr Ala Arg Ala Phe
            1860                1865                1870

Leu Asp Asp Thr Asn Thr Lys Arg Tyr Pro Asp Asn Lys Val Lys Leu
            1875                1880                1885

Leu Lys Glu Val Phe Arg Gln Phe Val Glu Ala Cys Gly Gln Ala Leu
        1890                1895                1900

Ala Val Asn Glu Arg Leu Ile Lys Glu Asp Gln Leu Glu Tyr Gln Glu
1905                1910                1915                1920

Glu Met Lys Ala Asn Tyr Arg Glu Met Ala Lys Glu Leu Ser Glu Ile
            1925                1930                1935

Met His Glu Gln Ile Cys Pro Leu Glu Glu Lys Thr Ser Val Leu Pro
        1940                1945                1950

Asn Ser Leu His Ile Phe Asn Ala Ile Ser Gly Thr Pro Thr Ser Thr
        1955                1960                1965
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<211> 2045
<212> PRT
<213> Homo sapiens

<220>
<223> human CLASP-7

<400> 92
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Met Ala Ala Ser Glu Arg Arg Ala Phe Ala His Lys Ile Asn Arg Thr
 1               5                  10                  15

Val Ala Ala Glu Val Arg Lys Gln Val Ser Arg Glu Arg Ser Gly Ser
                20                  25                  30

Pro His Ser Ser Arg Arg Cys Ser Ser Ser Leu Gly Val Pro Leu Thr
                35                  40                  45

Glu Val Val Glu Pro Leu Asp Phe Glu Asp Val Leu Leu Ser Arg Pro
        50                  55                  60

Pro Asp Ala Glu Pro Gly Pro Leu Arg Asp Leu Val Glu Phe Pro Ala
 65                  70                  75                  80

Asp Asp Leu Glu Leu Leu Leu Gln Pro Arg Glu Cys Arg Thr Thr Glu
                85                  90                  95

Pro Gly Ile Pro Lys Asp Glu Lys Leu Asp Ala Gln Val Arg Ala Ala
                100                 105                 110

Val Glu Met Tyr Ile Glu Asp Trp Val Ile Val His Arg Arg Tyr Gln
                115                 120                 125

Tyr Leu Ser Ala Ala Tyr Ser Pro Val Thr Thr Asp Thr Gln Arg Glu
        130                 135                 140

Arg Gln Lys Gly Leu Pro Arg Gln Val Phe Glu Gln Asp Ala Ser Gly
145                 150                 155                 160

Asp Glu Arg Ser Gly Pro Glu Asp Ser Asn Asp Ser Arg Arg Gly Ser
                165                 170                 175

Gly Ser Pro Glu Asp Thr Pro Arg Ser Ser Gly Ala Ser Ser Ile Phe
                180                 185                 190

Asp Leu Arg Asn Leu Ala Ala Asp Ser Leu Leu Pro Ser Leu Leu Glu
                195                 200                 205

Arg Ala Ala Pro Glu Asp Val Asp Arg Arg Asn Glu Thr Leu Arg Arg
        210                 215                 220

Gln His Arg Pro Pro Ala Leu Leu Thr Leu Tyr Pro Ala Pro Asp Glu
225                 230                 235                 240
```

Glu Ile Glu Pro Ile Phe Gly Ile Leu Ala Leu Tyr Asp Val Arg Glu
        275   280   285

Lys Lys Lys Ile Ser Glu Asn Phe Tyr Phe Asp Leu Asn Ser Asp Ser
        290   295   300

Met Lys Gly Leu Leu Arg Ala His Gly Thr His Pro Ala Ile Ser Thr
305   310   315   320

Leu Ala Arg Ser Ala Ile Phe Ser Val Thr Tyr Pro Ser Pro Asp Ile
            325   330   335

Phe Leu Val Ile Lys Leu Glu Lys Val Leu Gln Gln Gly Asp Ile Ser
            340   345   350

Glu Cys Cys Glu Pro Tyr Met Val Leu Lys Glu Val Asp Thr Ala Lys
        355   360   365

Asn Lys Glu Lys Leu Glu Lys Leu Arg Leu Ala Ala Glu Gln Phe Cys
        370   375   380

Thr Arg Leu Gly Arg Tyr Arg Met Pro Phe Ala Trp Thr Ala Val His
385   390   395   400

Leu Ala Asn Ile Val Ser Ser Ala Gly Gln Leu Asp Arg Asp Ser Asp
            405   410   415

Ser Glu Gly Glu Arg Arg Pro Ala Trp Thr Asp Arg Arg Arg Arg Gly
            420   425   430

Pro Gln Asp Arg Ala Ser Ser Gly Asp Asp Ala Cys Ser Phe Ser Gly
        435   440   445

Phe Arg Pro Ala Thr Leu Thr Val Thr Asn Phe Phe Lys Gln Glu Ala
        450   455   460

Glu Arg Leu Ser Asp Glu Asp Leu Phe Lys Phe Leu Ala Asp Met Arg
465   470   475   480

Arg Pro Ser Ser Leu Leu Arg Arg Leu Arg Pro Val Thr Ala Gln Leu
            485   490   495

Lys Ile Asp Ile Ser Pro Ala Pro Glu Asn Pro His Phe Cys Leu Ser
            500   505   510

Pro Glu Leu Leu His Ile Lys Pro Tyr Pro Asp Pro Arg Gly Arg Pro
            515   520   525

Thr Lys Glu Ile Leu Glu Phe Pro Ala Arg Glu Val Tyr Ala Pro His
            530   535   540

Thr Ser Tyr Arg Asn Leu Leu Tyr Val Tyr Pro His Ser Leu Asn Phe
545   550   555   560

Ser Ser Cys Ser Glu Phe Thr Arg Glu Ala Phe Thr Pro Val Val Tyr
        595   600   605

His Asn Lys Ser Pro Glu Phe Tyr Glu Glu Phe Lys Leu His Leu Pro
        610   615   620

Ala Cys Val Thr Glu Asn His His Leu Leu Phe Thr Phe Tyr His Val
625   630   635   640

Ser Cys Gln Pro Arg Pro Gly Thr Ala Leu Glu Thr Pro Val Gly Phe
                645   650   655

Thr Trp Ile Pro Leu Leu Gln His Gly Arg Leu Arg Thr Gly Pro Phe
                660   665   670

Cys Leu Pro Val Ser Val Asp Gln Pro Pro Pro Ser Tyr Ser Val Leu
            675   680   685

Thr Pro Asp Val Ala Leu Pro Gly Met Arg Trp Val Asp Gly His Lys
        690   695   700

Gly Val Phe Ser Val Glu Leu Thr Ala Val Ser Ser Val His Pro Gln
705   710   715   720

Asp Pro Tyr Leu Asp Lys Phe Phe Thr Leu Val His Val Leu Glu Glu
                725   730   735

Gly Ala Phe Pro Phe Arg Leu Lys Asp Thr Val Leu Ser Glu Gly Asn
            740   745   750

Val Glu Gln Glu Leu Arg Ala Ser Leu Ala Ala Leu Arg Leu Ala Ser
        755   760   765

Pro Glu Pro Leu Val Ala Phe Ser His His Val Leu Asp Lys Leu Val
        770   775   780

Arg Leu Val Ile Arg Pro Pro Ile Ile Ser Gly Gln Ile Val Asn Leu
785   790   795   800

Gly Arg Gly Ala Phe Glu Ala Met Ala His Val Val Ser Leu Val His
            805   810   815

Arg Ser Leu Glu Ala Ala Gln Asp Ala Arg Gly His Cys Pro Gln Leu
        820   825   830

Ala Ala Tyr Val His Tyr Ala Phe Arg Leu Pro Gly Thr Glu Pro Ser
        835   840   845

Leu Pro Asp Gly Ala Pro Pro Val Thr Val Gln Ala Ala Thr Leu Ala
    850   855   860

Arg Gly Ser Gly Arg Pro Ala Ser Leu Tyr Leu Ala Arg Ser Lys Ser
865   870   875   880

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Ala Leu Gln Trp Val Val Ser Ser Ser Ala Val Arg Glu Ala Ile Leu
        915                 920                 925

Gln His Ala Trp Phe Phe Phe Gln Leu Met Val Lys Ser Met Ala Leu
        930                 935                 940

His Leu Leu Leu Gly Gln Arg Leu Asp Thr Pro Arg Lys Leu Arg Phe
945                 950                 955                 960

Pro Gly Arg Phe Leu Asp Asp Ile Thr Ala Leu Val Gly Ser Val Gly
                965                 970                 975

Leu Glu Val Ile Thr Arg Val His Lys Asp Val Glu Leu Ala Glu His
                980                 985                 990

Leu Asn Ala Ser Leu Ala Phe Phe Leu Ser Asp Leu Leu Ser Leu Val
        995                 1000                1005

Asp Arg Gly Phe Val Phe Ser Leu Val Arg Ala His Tyr Lys Gln Val
        1010                1015                1020

Ala Thr Arg Leu Gln Ser Ser Pro Asn Pro Ala Ala Leu Leu Thr Leu
1025                1030                1035                1040

Arg Met Glu Phe Thr Arg Ile Leu Cys Ser His Glu His Tyr Val Thr
                1045                1050                1055

Leu Asn Leu Pro Cys Cys Pro Leu Ser Pro Pro Ala Ser Pro Ser Pro
        1060                1065                1070

Ser Val Ser Ser Thr Thr Ser Gln Ser Ser Thr Phe Ser Ser Gln Ala
        1075                1080                1085

Pro Asp Pro Lys Val Thr Ser Met Phe Glu Leu Ser Gly Pro Phe Arg
        1090                1095                1100

Gln Gln His Phe Leu Ala Gly Leu Leu Leu Thr Glu Leu Ala Leu Ala
1105                1110                1115                1120

Leu Gln Glu Asp Gln Asp Val Arg His Leu Ala Leu Ala Val Leu Lys
                1125                1130                1135

Asn Leu Met Ala Lys His Ser Phe Asp Asp Arg Tyr Arg Glu Pro Arg
                1140                1145                1150

Lys Gln Ala Gln Ile Ala Ser Leu Tyr Met Pro Leu Tyr Gly Met Leu
        1155                1160                1165

Leu Asp Asn Met Pro Arg Ile Arg Leu His Asp Phe Ala Glu Gly Pro
        1170                1175                1180

Gly Gln Arg Ser Arg Leu Ala Ser Met Leu Asp Ser Asp Thr Glu Gly
1185                1190                1195                1200
```

Pro Pro Thr Ala Ser Arg Ala Gly Cys Ala Leu Ser Ala Glu Ser Ser
        1235   1240   1245

Arg Thr Leu Leu Ala Cys Val Leu Trp Val Leu Lys Asn Thr Glu Pro
    1250   1255   1260

Ala Leu Leu Gln Arg Trp Ala Thr Asp Leu Thr Leu Pro Gln Leu Gly
1265   1270   1275   1280

Arg Leu Leu Asp Leu Leu Tyr Leu Cys Leu Ala Ala Phe Glu Tyr Lys
        1285   1290   1295

Gly Lys Lys Ala Phe Glu Arg Ile Asn Ser Leu Thr Phe Lys Lys Ser
        1300   1305   1310

Leu Asp Met Lys Ala Arg Leu Glu Glu Ala Ile Leu Gly Thr Ile Gly
        1315   1320   1325

Ala Arg Gln Glu Met Val Arg Arg Ser Arg Glu Arg Ser Pro Phe Gly
    1330   1335   1340

Asn Pro Glu Asn Val Arg Trp Arg Lys Ser Val Thr His Trp Lys Gln
1345   1350   1355   1360

Thr Ser Asp Arg Val Asp Lys Thr Lys Asp Glu Met Glu His Glu Ala
        1365   1370   1375

Leu Val Glu Gly Asn Leu Ala Thr Glu Ala Ser Leu Val Val Leu Asp
        1380   1385   1390

Thr Leu Glu Ile Ile Val Gln Thr Val Met Leu Ser Glu Ala Arg Glu
        1395   1400   1405

Ser Val Leu Gly Ala Val Leu Lys Val Val Leu Tyr Ser Leu Gly Ser
    1410   1415   1420

Ala Gln Ser Ala Leu Phe Leu Gln His Gly Leu Ala Thr Gln Arg Ala
1425   1430   1435   1440

Leu Val Ser Lys Phe Pro Glu Leu Leu Phe Glu Glu Asp Thr Glu Leu
        1445   1450   1455

Cys Ala Asp Leu Cys Leu Arg Leu Leu Arg His Cys Gly Ser Arg Ile
        1460   1465   1470

Ser Thr Ile Arg Thr His Ala Ser Ala Ser Leu Tyr Leu Leu Met Arg
        1475   1480   1485

Gln Asn Phe Glu Ile Gly His Asn Phe Ala Arg Val Lys Met Gln Val
    1490   1495   1500

Thr Met Ser Leu Ser Ser Leu Val Gly Thr Thr Gln Asn Phe Ser Glu
1505   1510   1515   1520

```
Met Phe Asn Leu His Met Ile Leu Thr Asp Thr Val Lys Met Lys Glu
    1555                1560                1565

His Gln Glu Asp Pro Glu Met Leu Ile Asp Leu Met Tyr Arg Ile Ala
    1570                1575                1580

Arg Gly Tyr Gln Gly Ser Pro Asp Leu Arg Leu Thr Trp Leu Gln Asn
1585                1590                1595                1600

Met Ala Gly Lys His Ala Glu Leu Gly Asn His Ala Glu Ala Ala Gln
            1605                1610                1615

Cys Met Val His Ala Ala Ala Leu Val Ala Glu Tyr Leu Ala Leu Leu
            1620                1625                1630

Glu Asp Gln Arg His Leu Pro Val Gly Cys Val Ser Phe Gln Asn Ile
            1635                1640                1645

Ser Ser Asn Val Leu Glu Glu Ser Ala Ile Ser Asp Asp Ile Leu Ser
    1650                1655                1660

Pro Asp Glu Glu Gly Phe Cys Ser Gly Lys His Phe Thr Glu Leu Gly
1665                1670                1675                1680

Leu Val Gly Leu Leu Glu Gln Ala Ala Gly Tyr Phe Thr Met Gly Gly
            1685                1690                1695

Leu Tyr Glu Ala Val Asn Glu Val Tyr Lys Asn Leu Ile Pro Ile Leu
            1700                1705                1710

Glu Ala His Arg Asp Tyr Lys Lys Leu Ala Ala Val His Gly Lys Leu
            1715                1720                1725

Gln Glu Ala Phe Thr Lys Ile Met His Gln Ser Ser Gly Trp Glu Arg
    1730                1735                1740

Val Phe Gly Thr Tyr Phe Arg Val Gly Phe Tyr Gly Ala His Phe Gly
1745                1750                1755                1760

Asp Leu Asp Glu Gln Glu Phe Val Tyr Lys Glu Pro Ser Ile Thr Lys
            1765                1770                1775

Leu Ala Glu Ile Ser His Arg Leu Glu Glu Phe Tyr Thr Glu Arg Phe
            1780                1785                1790

Gly Asp Asp Val Val Glu Ile Ile Lys Asp Ser Tyr Pro Val Asp Lys
            1795                1800                1805

Ser Lys Leu Asp Ser Gln Lys Ala Tyr Ile Gln Ile Thr Tyr Val Glu
    1810                1815                1820

Pro Tyr Phe Asp Thr Tyr Glu Leu Lys Asp Arg Val Thr Tyr Phe Asp
1825                1830                1835                1840
```

Leu Leu Ser Thr Asp His Ala Phe Pro Tyr Ile Lys Thr Arg Ile Arg
        1875   1880   1885

Val Cys His Arg Glu Glu Thr Val Leu Thr Pro Val Glu Val Ala Ile
        1890   1895   1900

Glu Asp Met Gln Lys Lys Thr Arg Glu Leu Ala Phe Ala Thr Glu Gln
1905   1910   1915   1920

Asp Pro Pro Asp Ala Lys Met Leu Gln Met Val Leu Gln Gly Ser Val
            1925   1930   1935

Gly Pro Thr Val Asn Gln Gly Pro Leu Glu Val Ala Gln Val Phe Leu
            1940   1945   1950

Ala Glu Ile Pro Glu Asp Pro Lys Leu Phe Arg His His Asn Lys Leu
            1955   1960   1965

Arg Leu Cys Phe Lys Asp Phe Cys Lys Lys Cys Glu Asp Ala Leu Arg
            1970   1975   1980

Lys Asn Lys Ala Leu Ile Gly Pro Asp Gln Lys Glu Tyr His Arg Glu
1985   1990   1995   2000

Leu Glu Arg Asn Tyr Cys Arg Leu Arg Glu Ala Leu Gln Pro Leu Leu
            2005   2010   2015

Thr Gln Arg Leu Pro Gln Leu Met Ala Pro Thr Pro Pro Gly Leu Arg
            2020   2025   2030

Asn Ser Leu Asn Arg Ala Ser Phe Arg Lys Ala Asp Leu
            2035   2040   2045

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<212> PRT
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<220>
<223> human CLASP-1

<400> 93
Met Ser Phe Arg Gly Lys Val Phe Lys Arg Glu Pro Ser Glu Phe Trp
    1   5   10   15

Lys Lys Arg Arg Thr Val Arg Arg Val Ile Gln Glu Glu Phe His Arg
            20   25   30

Phe Ser Ser Gln Glu Lys Pro Arg Leu Leu Glu Pro Leu Asp Tyr Glu
        35   40   45

Thr Val Ile Glu Glu Leu Glu Lys Thr Tyr Arg Asn Asp Pro Leu Gln

Lys Ala Glu Asn Leu Leu Val Lys Glu Ala Cys Lys Phe Tyr Ser Ser
            100   105   110

Gln Trp His Val Val Asn Tyr Lys Tyr Glu Gln Tyr Ser Gly Asp Ile
            115   120   125

Arg Gln Leu Pro Arg Ala Glu Tyr Lys Pro Glu Lys Leu Pro Ser His
        130   135   140

Ser Phe Glu Ile Asp His Glu Asp Ala Asp Lys Asp Glu Asp Thr Thr
145   150   155   160

Ser His Ser Ser Ser Lys Gly Gly Gly Gly Ala Gly Gly Thr Gly Val
                165   170   175

Phe Lys Ser Gly Trp Leu Tyr Lys Gly Asn Phe Asn Ser Thr Val Asn
            180   185   190

Asn Thr Val Thr Val Arg Ser Phe Lys Lys Arg Tyr Phe Gln Leu Thr
            195   200   205

Gln Leu Pro Asp Asn Ser Tyr Ile Met Asn Phe Tyr Lys Asp Glu Lys
        210   215   220

Ile Ser Lys Glu Pro Lys Gly Cys Ile Phe Leu Asp Ser Cys Thr Gly
225   230   235   240

Val Val Gln Asn Asn Arg Leu Arg Lys Tyr Ala Phe Glu Leu Lys Met
                245   250   255

Asn Asp Leu Thr Tyr Phe Val Leu Ala Ala Glu Thr Glu Ser Asp Met
            260   265   270

Asp Glu Trp Ile His Thr Leu Asn Arg Ile Leu Gln Ile Ser Pro Glu
            275   280   285

Gly Pro Leu Gln Gly Arg Arg Ser Thr Glu Leu Thr Asp Leu Gly Leu
        290   295   300

Asp Ser Leu Asp Asn Ser Val Thr Cys Glu Cys Thr Pro Glu Glu Thr
305   310   315   320

Asp Ser Ser Glu Asn Asn Leu His Ala Asp Phe Ala Lys Tyr Leu Thr
                325   330   335

Glu Thr Glu Asp Thr Val Lys Thr Thr Arg Asn Met Glu Arg Leu Asn
            340   345   350

Leu Phe Ser Leu Asp Pro Asp Ile Asp Thr Leu Lys Leu Gln Lys Lys
            355   360   365

Asp Leu Leu Glu Pro Glu Ser Val Ile Lys Pro Phe Glu Glu Lys Ala
            370   375   380

Phe Phe Val Ser Val Ala Leu Tyr Asp Leu Arg Asp Ser Arg Lys Ile
            420   425   430

Ser Ala Asp Phe His Val Asp Leu Asn His Ala Ala Val Arg Gln Met
            435   440   445

Leu Leu Gly Ala Ser Val Ala Leu Glu Asn Gly Asn Ile Asp Thr Ile
    450   455   460

Thr Pro Arg Gln Ser Glu Glu Pro His Ile Lys Gly Leu Pro Glu Glu
465   470   475   480

Trp Leu Lys Phe Pro Lys Gln Ala Val Phe Ser Val Ser Asn Pro His
            485   490   495

Ser Glu Ile Val Leu Val Ala Lys Ile Glu Lys Val Leu Met Gly Asn
            500   505   510

Ile Ala Ser Gly Ala Glu Pro Tyr Ile Lys Asn Pro Asp Ser Asn Lys
            515   520   525

Tyr Ala Gln Lys Ile Leu Lys Ser Asn Arg Gln Phe Cys Ser Lys Leu
    530   535   540

Gly Lys Tyr Arg Arg Ala Phe Ala Trp Ala Val Arg Ser Val Phe Lys
545   550   555   560

Asp Asn Gln Gly Asn Val Asp Arg Asp Ser Arg Phe Ser Pro Leu Phe
            565   570   575

Arg Gln Glu Ser Ser Lys Ile Ser Thr Glu Asp Leu Val Lys Leu Val
            580   585   590

Ser Asp Tyr Arg Arg Ala Asp Arg Ile Ser Lys Met Gln Thr Ile Pro
            595   600   605

Gly Ser Leu Asp Ile Ala Val Asp Asn Val Pro Leu Glu His Pro Asn
    610   615   620

Cys Val Thr Ser Ser Phe Ile Pro Val Lys Pro Phe Asn Met Met Ala
625   630   635   640

Gln Thr Glu Pro Thr Val Glu Val Glu Glu Phe Val Tyr Asp Ser Thr
            645   650   655

Lys Tyr Cys Arg Pro Tyr Arg Val Tyr Lys Asn Gln Ile Tyr Ile Tyr
            660   665   670

Pro Lys His Leu Lys Tyr Asp Ser Gln Lys Cys Phe Asn Lys Ala Arg
            675   680   685

Asn Ile Thr Val Cys Ile Glu Phe Lys Asn Ser Asp Glu Glu Ser Ala
690   695   700

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Ser Asp Glu Val Lys Ile Glu Leu Pro Thr Gln Leu His Glu Lys His
            740             745             750

His Ile Leu Phe Ser Phe Tyr His Val Thr Cys Asp Ile Asn Ala Lys
            755             760             765

Ala Asn Ala Lys Lys Lys Glu Ala Leu Glu Thr Ser Val Gly Tyr Ala
    770             775             780

Trp Leu Pro Leu Met Lys His Asp Gln Ile Ala Ser Gln Glu Tyr Asn
785             790             795             800

Ile Pro Ile Ala Thr Ser Leu Pro Pro Asn Tyr Leu Ser Phe Gln Asp
                805             810             815

Ser Ala Ser Gly Lys His Gly Gly Ser Asp Ile Lys Trp Val Asp Gly
            820             825             830

Gly Lys Pro Leu Phe Lys Val Ser Thr Phe Val Val Ser Thr Val Asn
    835             840             845

Thr Gln Asp Pro His Val Asn Ala Phe Phe Gln Glu Cys Gln Lys Arg
    850             855             860

Glu Lys Asp Met Ser Gln Ser Pro Thr Ser Asn Phe Ile Arg Ser Cys
865             870             875             880

Lys Asn Leu Leu Asn Val Glu Lys Ile His Ala Ile Met Ser Phe Leu
            885             890             895

Pro Ile Ile Leu Asn Gln Leu Phe Lys Val Leu Val Gln Asn Glu Glu
            900             905             910

Asp Glu Ile Thr Thr Thr Val Thr Arg Val Leu Pro Asp Ile Val Ala
            915             920             925

Lys Cys His Glu Glu Gln Leu Asp His Ser Val Gln Ser Tyr Ile Lys
    930             935             940

Phe Val Phe Lys Thr Arg Ala Cys Lys Glu Arg Pro Val His Glu Asp
945             950             955             960

Leu Ala Lys Asn Val Thr Gly Leu Leu Lys Ser Asn Asp Ser Pro Thr
            965             970             975

Val Lys His Val Leu Lys His Ser Trp Phe Phe Phe Ala Ile Ile Leu
            980             985             990

Lys Ser Met Ala Gln His Leu Ile Asp Thr Asn Lys Ile Gln Leu Pro
    995             1000            1005

Arg Pro Gln Arg Phe Pro Glu Ser Tyr Gln Asn Glu Leu Asp Asn Leu
    1010            1015            1020
```

Cys Phe Thr Phe Met Asp Arg Gly Cys Val Phe Lys Met Val Asn Asn
       1060   1065   1070

Tyr Ile Ser Met Phe Ser Ser Gly Asp Leu Lys Thr Leu Cys Gln Tyr
       1075   1080   1085

Lys Phe Asp Phe Leu Gln Glu Val Cys Gln His Glu His Phe Ile Pro
   1090   1095   1100

Leu Cys Leu Pro Ile Arg Ser Ala Asn Ile Pro Asp Pro Leu Thr Pro
1105   1110   1115   1120

Ser Glu Ser Thr Gln Glu Leu His Ala Ser Asp Met Pro Glu Tyr Ser
                 1125   1130   1135

Val Thr Asn Glu Phe Cys Arg Lys His Phe Leu Ile Gly Ile Leu Leu
              1140   1145   1150

Arg Glu Val Gly Phe Ala Leu Gln Glu Asp Gln Asp Val Arg His Leu
          1155   1160   1165

Ala Leu Ala Val Leu Lys Asn Leu Met Ala Lys His Ser Phe Asp Asp
       1170   1175   1180

Arg Tyr Arg Glu Pro Arg Lys Gln Ala Gln Ile Ala Ser Leu Tyr Met
1185   1190   1195   1200

Pro Leu Tyr Gly Met Leu Leu Asp Asn Met Pro Arg Ile Tyr Leu Lys
              1205   1210   1215

Asp Leu Tyr Pro Phe Thr Val Asn Thr Ser Asn Gln Gly Ser Arg Asp
          1220   1225   1230

Asp Leu Ser Thr Asn Gly Gly Phe Gln Ser Gln Thr Ala Ile Lys His
          1235   1240   1245

Ala Asn Ser Val Asp Thr Ser Phe Ser Lys Asp Val Leu Asn Ser Ile
       1250   1255   1260

Ala Ala Phe Ser Ser Ile Ala Ile Ser Thr Val Asn His Ala Asp Ser
1265   1270   1275   1280

Arg Ala Ser Leu Ala Ser Leu Asp Ser Asn Pro Ser Thr Asn Glu Lys
          1285   1290   1295

Ser Ser Glu Lys Thr Asp Asn Cys Glu Lys Ile Pro Arg Pro Leu Ala
          1300   1305   1310

Leu Ile Gly Ser Thr Leu Arg Phe Asp Arg Leu Asp Gln Ala Glu Thr
          1315   1320   1325

Arg Ser Leu Leu Met Cys Phe Leu His Ile Met Lys Thr Ile Ser Tyr
       1330   1335   1340

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Gly Lys Arg Asn Ile Ile Arg Lys Ile Ala Ala Ala Phe Lys Phe Val
      1380                  1385                  1390

Gln Ser Thr Gln Asn Asn Gly Thr Leu Lys Gly Ser Asn Pro Ser Cys
      1395                  1400                  1405

Gln Thr Ser Gly Leu Leu Ala Gln Trp Met His Ser Thr Ser Arg His
      1410                  1415                  1420

Glu Gly His Lys Gln His Arg Ser Gln Thr Leu Pro Ile Ile Arg Gly
1425                  1430                  1435                  1440

Lys Asn Ala Leu Ser Asn Pro Lys Leu Leu Gln Met Leu Asp Asn Thr
                  1445                  1450                  1455

Met Thr Ser Asn Ser Asn Glu Ile Asp Ile Val His His Val Asp Thr
      1460                  1465                  1470

Glu Ala Asn Ile Ala Thr Glu Gly Cys Leu Thr Ile Leu Asp Leu Val
      1475                  1480                  1485

Ser Leu Phe Thr Gln Thr His Gln Arg Gln Leu Gln Gln Cys Asp Cys
      1490                  1495                  1500

Gln Asn Ser Leu Met Lys Arg Gly Phe Asp Thr Tyr Met Leu Phe Phe
1505                  1510                  1515                  1520

Gln Val Asn Gln Ser Ala Thr Ala Leu Lys His Val Phe Ala Ser Leu
                  1525                  1530                  1535

Arg Leu Phe Val Cys Lys Phe Pro Ser Ala Phe Phe Gln Gly Pro Ala
      1540                  1545                  1550

Asp Leu Cys Gly Ser Phe Cys Tyr Glu Val Leu Lys Cys Cys Asn His
      1555                  1560                  1565

Arg Ser Arg Ser Thr Gln Thr Glu Ala Ser Ala Leu Leu Tyr Leu Phe
      1570                  1575                  1580

Met Arg Lys Asn Phe Glu Phe Asn Lys Gln Lys Ser Ile Val Arg Ser
1585                  1590                  1595                  1600

His Leu Gln Leu Ile Lys Ala Val Ser Gln Leu Ile Ala Asp Ala Gly
                  1605                  1610                  1615

Ile Gly Gly Ser Arg Phe Gln His Ser Leu Ala Ile Thr Asn Asn Phe
                  1620                  1625                  1630

Ala Asn Gly Asp Lys Gln Met Lys Asn Ser Asn Phe Pro Ala Glu Val
      1635                  1640                  1645

Lys Asp Leu Thr Lys Arg Ile Arg Thr Val Leu Met Ala Thr Ala Gln
      1650                  1655                  1660
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Leu Glu Ser Met Ala Lys Ile His Ala Arg Asn Gly Asp Leu Ser Glu
1700   1705   1710

Ala Ala Met Cys Tyr Ile His Ile Ala Ala Leu Ile Ala Glu Tyr Leu
          1715   1720   1725

Lys Arg Lys Gly Tyr Trp Lys Val Glu Lys Ile Cys Thr Ala Ser Leu
          1730   1735   1740

Leu Ser Glu Asp Thr His Pro Cys Asp Ser Asn Ser Leu Leu Thr Thr
1745   1750   1755   1760

Pro Ser Gly Gly Ser Met Phe Ser Met Gly Trp Pro Ala Phe Leu Ser
                1765   1770   1775

Ile Thr Pro Asn Ile Lys Glu Glu Gly Ala Ala Lys Glu Asp Ser Gly
                1780   1785   1790

Met His Asp Thr Pro Tyr Asn Glu Asn Ile Leu Val Glu Gln Leu Tyr
          1795   1800   1805

Met Cys Gly Glu Phe Leu Trp Lys Ser Glu Arg Tyr Glu Leu Ile Ala
          1810   1815   1820

Asp Val Asn Lys Pro Ile Ile Ala Val Phe Glu Lys Gln Arg Asp Phe
1825   1830   1835   1840

Lys Lys Leu Ser Asp Leu Tyr Tyr Asp Ile His Arg Ser Tyr Leu Lys
                1845   1850   1855

Val Ala Glu Val Val Asn Ser Glu Lys Arg Leu Phe Gly Arg Tyr Tyr
          1860   1865   1870

Arg Val Ala Phe Tyr Gly Gln Gly Phe Phe Glu Glu Glu Glu Gly Lys
          1875   1880   1885

Glu Tyr Ile Tyr Lys Glu Pro Lys Leu Thr Gly Leu Ser Glu Ile Ser
          1890   1895   1900

Gln Arg Leu Leu Lys Leu Tyr Ala Asp Lys Phe Gly Ala Asp Asn Val
1905   1910   1915   1920

Lys Ile Ile Gln Asp Ser Asn Lys Val Asn Pro Lys Asp Leu Asp Pro
                1925   1930   1935

Lys Tyr Ala Tyr Ile Gln Val Thr Tyr Val Thr Pro Phe Phe Glu Glu
          1940   1945   1950

Lys Glu Ile Glu Asp Arg Lys Thr Asp Phe Glu Met His His Asn Ile
          1955   1960   1965

Asn Arg Phe Val Phe Glu Thr Pro Phe Thr Leu Ser Gly Lys Lys His
          1970   1975   1980

Ser Thr Glu Leu Asn Pro Ile Glu Val Ala Ile Asp Glu Met Ser Arg
        2020   2025   2030

Lys Val Ser Glu Leu Asn Gln Leu Cys Thr Met Glu Glu Val Asp Met
        2035   2040   2045

Ile Ser Leu Gln Leu Lys Leu Gln Gly Ser Val Ser Val Lys Val Asn
    2050   2055   2060

Ala Gly Pro Met Ala Tyr Ala Arg Ala Phe Leu Glu Glu Thr Asn Ala
2065   2070   2075   2080

Lys Lys Tyr Pro Asp Asn Gln Val Lys Leu Leu Lys Glu Ile Phe Arg
                2085   2090   2095

Gln Phe Ala Asp Ala Cys Gly Gln Ala Leu Asp Val Asn Glu Arg Leu
            2100   2105   2110

Ile Lys Glu Asp Gln Leu Glu Tyr Gln Glu Glu Leu Arg Ser His Tyr
        2115   2120   2125

Lys Asp Met Leu Ser Glu Leu Ser Thr Val Met Asn Glu Gln Ile Thr
    2130   2135   2140

Gly Arg Asp Asp Leu Ser Lys Arg Gly Val Asp Gln Thr Cys Thr Arg
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Val Ile Ser Lys Ala Thr Pro Ala Leu Pro Thr Val Ser Ile Ser Ser
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Ser Ala Glu Val
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